P/16-300 DIV

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of

Katsuyuki SAITO, et al. Date: January 7, 2002

Serial No.: Group Art Unit: Unassigned

Filed: Examiner: Unassigned

For: ENDOSCOPIC IMAGING SYSTEM MAKING IT POSSIBLE TO DETACHABLY ATTACH EXPANSION UNIT HAVING EXTERNAL EXPANSION FACILITY AND ADD EXPANSION FACILITY FOR IMPROVING CAPABILITY OF SYSTEM

Asst. Commissioner for Patents
Washington, D.C. 20231

PRELIMINARY AMENDMENT

Prior to examination on the merits, please amend the above-identified application as follows:

FEE CALCULATION

No additional fee is required.

In the event the actual fee is greater than the payment submitted or is inadvertently not enclosed or if any additional fee during the prosecution of this application is not paid, the Patent Office is authorized to charge the underpayment to Deposit Account No. 15-0700.

CONTINGENT EXTENSION REQUEST

If this communication is filed after the shortened statutory time period had elapsed and no separate Petition is enclosed, the Commissioner of Patents and Trademarks is petitioned, under 37 C.F.R. §1.136(a), to extend the time for filing a response to the outstanding Office Action by the number of months which will avoid abandonment under 37 C.F.R. §1.135. The fee under 37 C.F.R. § 1.17 should be charged to our Deposit Account No. 15-0700.

AMENDMENTS

1. X If checked, amendments to the specification and/or claims are submitted herewith.

___ If checked, an abstract is submitted as the last page of Appendix A.

2. Specification:

On page 1, between the title and the first section heading, please insert a paragraph as set forth in Appendix A attached hereto.

Please delete the two paragraphs beginning at page 2, line 1; delete the two paragraphs beginning at page 4, line 8 to page 5, line 9; delete the paragraph beginning at page 5, line 10; delete the section heading on page 5, line 22 and delete the paragraph on page 5, line 23 through page 6, line 3; delete the four paragraphs beginning at page 6, line 4, through page 7, line 3; delete the paragraph beginning at page 7, line 8; delete the paragraph beginning at page 7, line 18; delete the paragraph beginning at page 7, line 23; delete the paragraph beginning at page 8, line 5; delete the paragraph beginning at page 9, line 4; delete the paragraph beginning at page 9, line 14; delete the four separate paragraphs beginning at page 10, line 6, line 9, line 14, and line 22, respectively; delete the three separate paragraphs beginning at page 11, line 9, line 16, and line 22, respectively; delete the three separate paragraphs beginning at page 12, line 3, line 9, and line 18, respectively; delete the two paragraphs beginning at page 13, line 6, through page 14, line 6; delete the paragraph beginning at page 14, line 19; delete the two paragraphs beginning at page 15, line 2; delete the two paragraphs beginning at page 16, line 2; delete the three separate paragraphs beginning at page 17, line 2 and line 15, respectively; delete the paragraph beginning at page 17, line 25 through page 18, line 7; delete the paragraph beginning at page 18, line 14; delete the paragraph beginning at page 19, line 1; delete the paragraph beginning at page 19, line 13 through page 20, line 8; delete the paragraph beginning at page 20, line 22; delete the two separate paragraphs beginning at page 21, line 9 and line 15, respectively; delete the three separate paragraphs beginning at page 22, line 1 and line 10, respectively; delete the paragraph beginning at page 22, line 24 through page 23, line 16; delete the two paragraphs beginning at page 23, line 17 through page 24, line 9; delete the two paragraphs beginning at page 24, line 10 through page 25, line 7; delete the two paragraphs beginning at page

25, line 8, through page 26, line 3; delete the two paragraphs beginning at page 26, line 4; delete the paragraph beginning at page 28, line 13; delete the paragraph beginning at page 30, line 5; delete the paragraph beginning at page 31, line 1; delete the two paragraphs beginning at page 32, line 5, through page 33, line 3; delete the paragraph beginning at page 35, line 15 through page 36, line 2; delete the paragraph beginning at page 36, line 3; delete the paragraph beginning at page 37, line 9; delete the two paragraphs beginning at page 38, line 16 through page 39, line 5; delete the paragraph beginning at page 39, line 19; delete the two paragraphs beginning at page 40, line 1, through page 41, line 4; delete the paragraph beginning at page 41, line 14 through page 42, line 5; delete the two paragraphs beginning at page 42, line 6; delete the paragraph beginning at page 42, line 24 through page 43, line 11; delete the paragraph beginning at page 43, line 12; delete the two paragraphs beginning at page 44, line 14; delete the three paragraphs beginning at page 45, line 1 through page 46, line 3; delete the two paragraphs beginning at page 46, line 5 through page 47, line 1; delete the two paragraphs beginning at page 47, line 2 through page 48, line 2; delete the paragraph beginning at page 48, line 24 through page 49, line 9; delete the two paragraphs beginning at page 49, line 10 through page 50, line 11; delete the paragraph beginning at page 50, line 25 through page 51, line 8; delete the two paragraphs beginning at page 51, line 9 through page 52, line 6; delete the two paragraphs beginning at page 52, line 7 through page 53, line 2; delete the paragraph beginning at page 54, line 21 through page 55, line 5; delete the two paragraphs beginning at page 56, line 1; delete the paragraph beginning at page 56, line 23 through page 57, line 5; delete the two paragraphs beginning at page 57, line 6; delete the paragraph beginning at page 58, line 8; delete the two paragraphs beginning at page 58, line 21 through page 59, line 8; delete the two paragraphs beginning at page 59, line 9 through page 60, line 4; delete the paragraph beginning at page 60, line 17 through page 61, line 2; delete the paragraph beginning at page 61, line 14; delete the three separate paragraphs beginning at page 62, line 1 and line 15, respectively; delete the paragraph beginning at page 62, line 25 through page 63, line 2; delete the two paragraphs beginning at page 63, line 3 through page 64, line 2; delete the paragraph beginning at page 64, line 3; delete the paragraph beginning at page 64, line 25 through page 65, line 4; and delete the paragraph beginning at page 65, line 5, and replace such paragraphs/section heading pursuant to 37 C.F.R. § 1.121(b)(ii) with the "clean" version attached hereto as Appendix A. Entry is respectfully requested. A version

with markings to show the changes made pursuant to 37 C.F.R. § 1.121(b)(iii) is attached hereto as Appendix B.

3. Claims:

Please cancel claims 1-10 and 14-30 without prejudice.

Please amend claims 11-13 and add new claim 31 pursuant to 37 C.F.R. § 1.121(c)(i) as set forth in the "clean" version attached hereto as Appendix A. Entry is respectfully requested. A version with markings to show the changes made pursuant to 37 C.F.R. § 1.121(c)(ii) is attached hereto as Appendix B.

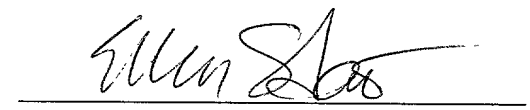
Drawings:

Please amend Figs. 19, 21-23, 32, 37, 39, 41 and 43 as marked in red on the attached copy thereof attached hereto at the end of Appendix B. Approval of the drawing amendments is respectfully requested. Corrected formal drawings incorporating the changes have been filed as a separate submission concurrently with this Preliminary Amendment.

REMARKS

The present application is being filed as a divisional application of U.S. Application Serial No. 09/120,559, pursuant to a Restriction Requirement made in the parent application. Pending claims 11-13 and 31 correspond to the invention described in the specification with reference to Figs. 17-20. The amendments presented herein are provided to improve the form of the specification, claims and drawings, including to correct minor errors therein. Approval of the drawing changes and examination on the merits upon entry of this Preliminary Amendment is respectfully requested.

Respectfully submitted,



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APPENDIX A

"CLEAN" VERSION OF EACH PARAGRAPH/SECTION/CLAIM
37 C.F.R. § 1.121(b)(ii) AND (c)(i)

SPECIFICATION:

On page 1, between the title and the section heading "Background of the Invention", please insert the following paragraph:

This application is a divisional application of Serial No. 09/120,559, filed July 22, 1998. Priority is claimed under 35 U.S.C. §119 based on Japanese Application Nos. H9-197114, filed July 23, 1997; H9-201565 filed July 28, 1997; H9-206679, filed July 31, 1997 and H9-208123, filed August 1, 1997.

Replacement for the two paragraphs beginning at page 2, line 1:

An endoscopic image projected by an endoscopic imaging system may be recorded for use in a clinical record or thesis. In this case, generally, the image has been filmed as a photograph in the past. Alternatively, the image has been recorded as a motion picture on videotape by means of a VTR, or recorded as digital image data on an information-recording device such as a hard disk. Recently, a PC card having a memory incorporated as a card-shaped compact portable recording medium therein has become popular.

A conventional endoscopic imaging system has not been designed so that a freely-detachable compact portable recording medium such as a PC card or any other expansion unit that has an external expansion capability can be detachably attached to a main processor unit such as a camera control unit. If a medium can be mounted directly in the main processor unit, it would be quite convenient for reading image data on the PC card or the like and help expand the capability of the system readily. However, as far as the conventional system is concerned, an expansion slot in which the expansion unit is mounted must be included separately. This may lead to a complex system configuration and time-consuming handling and invite an increase in cost.

Replacement for the two paragraphs beginning at page 4, line 8 through page 5, line 9:

For coping with the various use situations, a technology has been disclosed in, for example, Japanese Unexamined Patent Publication No. 7-194527. Herein, a ROM in which setting data is

stored is incorporated in an endoscope. A control unit reads the setting data, and modifies a sequence of controlling light adjustment or the like. However, a rigid scope employed in a surgical procedure and a camera head included in an endoscopic imaging system may be used in combination. A plurality of types of endoscopes may be attached to the camera head. There is difficulty in storing the setting data in the endoscopes. Even when the camera head is provided with a ROM for storing the setting data, it is rather meaningless.

As mentioned above, a ROM in which setting data is stored is incorporated in an endoscope, and a control unit references the setting data to modify a setting for an operation such as light adjustment. Thus, the conventional system is adjusted to specifications for endoscopes that are different from field to field, situations of objects, and other different use situations. However, an endoscope system may be constructed by combining an optical endoscope such as a rigid scope and a camera head included in an endoscopic imaging system. In this case, there are problems in that it is hard to store setting data in the endoscope, and a setting for an operation such as light adjustment cannot be modified according to a use situation.

Replacement for the paragraph beginning at page 5, line 10:

Moreover, when the conventional endoscopic imaging system is employed, a produced endoscopic image may be recorded on a compact portable recording medium which is freely attachable and detachable, such as a PC card. In this case, the recorded situation of image data on the medium is unclear to a user. This may result in such a drawback that necessary image data cannot be recorded or stored reliably. That is, an image cannot be recorded because of insufficient capacity, or previously recorded image data is overwritten. Moreover, if the PC card is improperly inserted or connected, recording of an image may fail.

Replacement for the section heading at page 5, line 22:

SUMMARY OF THE INVENTION

Replacement for the paragraph beginning at page 5, line 23 through page 6, line 3:

An aspect of the present invention is to provide an endoscopic imaging system making it possible to detachably attach an expansion unit which has an external expansion to a main unit, and to readily add an expansion facility for improving the capability of the system.

Replacement for the four paragraphs beginning at page 6, line 4 through page 7, line 3:

Another aspect of the present invention is to provide an endoscopic imaging system making it possible to automatically compress an endoscopic image at an optimal level of compressibility, and to thus improve the use efficiency of a recording medium.

Still another aspect of the present invention is to provide an endoscopic imaging system making it possible to readily achieve a proper setting for an operation according to a use situation.

Yet another aspect of the present invention is to provide an endoscopic imaging system making it possible to readily check the recorded situation of image data on a medium, and to thus prevent occurrence of an error during image recording.

In an endoscopic imaging system according to the present invention, a main processor unit including a signal processing means for processing a video signal representing an object image projected by an imaging means is provided with an expansion slot to which an expansion unit having an external expansion capability is freely detachably connected. When an expansion unit having an external expansion capability is detachably attached to the main unit, the expansion facility can be added to the system readily. Thus, the capability of the system can be improved.

Replacement for the paragraph beginning at page 7, line 8:

Figs. 1 and 3 relate to a first embodiment of the present invention;

Replacement for the paragraph beginning at page 7, line 18:

Figs. 4 and 5 relate to a second embodiment of the present invention;

Replacement for the paragraph beginning at page 7, line 23:

Figs. 6 and 7 relate to a third embodiment of the present invention;

Replacement for the paragraph beginning at page 8, line 5:

Figs. 8 to 16 relate to a fourth embodiment of the present invention;

Replacement for the paragraph beginning at page 9, line 4:

Figs. 17 to 20 relate to a fifth embodiment of the present invention;

Replacement for the paragraph beginning at page 9, line 14:

Figs. 21 to 29 relate to a sixth embodiment of the present invention;

Replacement for the paragraph beginning at page 10, line 6:

Fig. 27 is an explanatory diagram showing an example of setting data representing adjustment values associated with various fields;

Replacement for the paragraph beginning at page 10, line 9:

Fig. 28 is a flowchart describing an alarm operation to be carried out when an incorrect memory card is inserted;

Replacement for the paragraph beginning at page 10, line 14:

Figs. 30 and 31 relate to a seventh embodiment of the present invention;

Replacement for the paragraph beginning at page 10, line 22:

Figs. 32 to 36 relate to an eighth embodiment of the present invention;

Replacement for the paragraph beginning at page 11, line 9:

Figs. 37 and 38 relate to a ninth embodiment of the present invention;

Replacement for the paragraph beginning at page 11, line 16:

Figs. 39 and 40 relate to a tenth embodiment of the present invention;

Replacement for the paragraph beginning at page 11, line 22:

Figs. 41 and 42 relate to an eleventh embodiment of the present invention;

Replacement for the paragraph beginning at page 12, line 3:

Figs. 43 and 44 relate to a twelfth embodiment of the present invention;

Replacement for the paragraph beginning at page 12, line 9:

Fig. 45 is an explanatory diagram for demonstrating a drawback of a conventional system that when liquid such as water is spilled over a CCU, the liquid invades into the interior of an expansion slot; and

Replacement for the paragraph beginning at page 12, line 18:

As shown in Fig. 1, an endoscopic imaging system 1 of this embodiment comprises a camera head 2 having an imaging means incorporated therein, a scope 3 connected to the camera head 2, a light source apparatus 4 for supplying illumination light to the scope 3, a camera control unit 5 (hereinafter a CCU) serving as a main processor unit for processing a signal sent from the imaging means incorporated in the camera head 2, and a TV monitor 6 for displaying a standard video signal processed by the CCU 5. The scope 3 is a rigid endoscope such as a laparoscope used for, for example, a surgical procedure in the field of surgery.

Replacement for the two paragraphs beginning at page 13, line 6, through page 14, line 6:

When the endoscope imaging system 1 is in use, a light guide 8 of the scope 3 is, as shown in Fig. 1, linked to the light source apparatus 4. Illumination light emanating from a lamp in the light source apparatus 4 passes through a diaphragm that is not shown, is converged by a lens, and falls on the opposing end surface of the light guide 8. The illumination light is transmitted to the scope 3 over the light guide 8, passes through the scope 3, and is emitted forward through the distal end of the scope 3. Thus, an object in a patient's body cavity or the like is illuminated. An image represented by light reflected from the illuminated object is formed by the scope 3. A resultant object image is projected by the imaging means in the camera head 2 through the scope 3.

A CCD 7 serving as the imaging means is located on the focal plane of an imaging lens in the camera head 2. The object image is formed on the image plane of the CCD 7, and photoelectronically converted. The CCD 7 is connected to the CCU 5 by a camera cable 9 having a CCD driving signal transmission line and CCD output signal transmission line inserted therein. An output signal of the CCD 7 is sent to the CCU 5, and subjected to various kinds of signal processing. A video signal output from the CCU 5 is sent to the TV monitor 6. A view image of the object is then displayed on the TV monitor 6.

Replacement for the paragraph beginning at page 14, line 19:

On the succeeding side of the pre-processing circuit 12, there are an A/D converter 13 and Y/C separation circuit 14. The CCD output signal input to the pre-processing circuit 12 is pre-processed by carrying out correlation double sampling (CDS) and sample-and-hold (S/H). The resultant CCD output signal is input to the A/D converter 13 and converted into a digital signal, and then input to the Y/C separation circuit 14.

Replacement for the two paragraphs beginning at page 15, line 2:

On the succeeding side of the Y/C separation circuit 14, there are an RGB matrix circuit 15 and a white balance/black balance adjustment circuit 16. The digital signal input to the Y/C separation circuit 14 is recomposed according to the line-sequential system. Three digital signals Y, CR, and CB propagating through different channels and constituting the digital signal are then separated from one another, input to the RGB matrix circuit 15, and converted into an RGB digital signal. Thereafter, the white balance/black balance adjustment circuit 16 adjusts the white balance and black balance of the RGB digital signal.

On the succeeding side of the white balance/black balance adjustment circuit 16, there are a digital video processing circuit 17, a D/A converter 18, and a post-processing circuit 19. The RGB digital signal having undergone balance adjustment is digitally processed through enhancement, gamma correction, and character convolution carried out by the digital video processing circuit 17. Thereafter, the resultant signal is converted into an analog signal by the D/A converter 18, and then

input to the post-processing circuit 19. The analog signal that is input to the post-processing circuit 19 is converted into a standard video signal, and then output to the TV monitor 6.

Replacement for the two paragraphs beginning at page 16, line 2:

Moreover, on the succeeding side of the digital video processing circuit 17, there are a memory 20, a JPEG compression circuit 21, and a PC card driver 22. A PC card slot 23 is connected to the PC card driver 22. The digital signal having undergone various kinds of signal processing is stored in the memory 20. A PC card 24 having a memory incorporated therein is mounted in the PC card slot 23. A digital image signal read from the memory 20 is compressed by the JPEG compression circuit 21, and then recorded on the PC card 24 via the PC card driver 22.

Furthermore, the CCU 5 is provided with a CPU 25 responsible for various kinds of control including control of image recording on the PC card 24, and a font generator 26 for outputting a display of medium information including the number of image data items recordable on the PC card 24. Located on the front panel 28 of the CCU 5 are a release switch 29 used to provide a handling instruction (release instruction) for image recording and an LED 27 for displaying the medium information.

Replacement for the paragraph beginning at page 17, line 2:

In the endoscopic imaging system 1 having the foregoing components, an image signal produced by the scope 3 and visualized and processed by the camera head 2 is output to the TV monitor 6 and displayed in the form of an image. Additionally, the image signal is stored in the memory 20.

Replacement for the paragraph beginning at page 17, line 15:

Moreover, for image recording, medium information including the quantity of released image data representing a still image, i.e., the number of image data items recorded on the PC card 24 is sent from the CPU 25 to the font generator 26. The font generator 26 outputs the information as character information. The character information is then displayed in the LED 27 for displaying

medium information on the front panel. The quantity is indicated with numerals in the LED 27 and is incremented by one with every release.

Replacement for the paragraph beginning at page 17, line 25 through page 18, line 7:

When an endoscopic image is thus recorded using the PC card, recording and storage of a still image with little quality deterioration can be easily realized and at low cost. Thus, medium information including the number of image data items recorded on the PC card is displayed in the LED on the front panel of the CCU. This allows a user to readily check the number of remaining recordable images.

Replacement for the paragraph beginning at page 18, line 14:

Fig. 3 shows a variant of an endoscopic imaging system whose capability can be expanded. In the CCU 5 of this variant, a PC card 35 to which a remote control unit 34 can be connected is detachably attached to the PC card slot 23 in the front panel. The remote control unit 34 has a CPU which controls remote control-related facilities on a centralized basis and is independent of the CPU in the CCU 5, incorporated therein. When the remote control unit 34 is plugged into a remote control terminal 36 of the PC card 35, the CCU 5 or the like can be handled and controlled using the remote control unit 34.

Replacement for the paragraph beginning at page 19, line 1:

In other words, the remote control unit is connected to the PC card slot 23 via the PC card for recording image data as described in conjunction with the previous embodiment. Thus, control signals or the like can be transferred via a digital input/output interface in the slot.

Replacement for the two paragraphs beginning at page 19, line 13 through page 20, line 8:

An expansion unit to which the remote control unit is connected is not limited to a PC card. The remote control unit may be connected to any other expansion unit that can be detachably attached to the CCU. Otherwise, a CPU or the like may be incorporated in an expansion unit itself so that the remote control facilities can be installed in the CPU.

In this embodiment, an expansion slot in which an expansion unit is mounted is formed in a main processor unit included in an endoscopic imaging system. The expansion unit intended for external expansion capability, for example, a compact portable recording medium which is freely detachable and attachable, such as a PC card, can be detachably attached to the expansion slot. In this case, liquid may be spilled over the main processor unit because of user's carelessness during an examination or surgical procedure. The liquid may then invade into the expansion slot. This would bring about a short circuit between electrical contacts or corrosion in the main processor unit. A structure for preventing invasion of liquid is therefore needed.

Replacement for the paragraph beginning at page 20, line 22:

Figs. 4 and 5 show a structure of an expansion slot in accordance with a second embodiment of the present invention. Fig. 4 is a front view and Fig. 5 is a sectional view.

Replacement for the paragraph beginning at page 21, line 9:

According to the second embodiment, invasion of liquid into the expansion slot can be prevented by a simple structure. Thus, the fear of causing a short circuit between electrical contacts and corrosion in the CCU, can be eliminated.

Replacement for the paragraph beginning at page 21, line 15:

In a third embodiment, as shown in Fig. 6, a slope 44 is formed as part of an inner lower surface of an expansion slit 41 near the opening of the expansion slot. Owing to the slope 44, invasion of liquid into the expansion slot can be prevented as indicated with an arrow 43. Moreover, in a variant shown in Fig. 7, the whole expansion slot 41 may be formed on a slope 45. The same operation and advantage as those mentioned above can still be exerted.

Replacement for the paragraph beginning at page 22, line 1:

As with the second embodiment, invasion of liquid into the expansion slot can be prevented with a simple structure.

Replacement for the paragraph beginning at page 22, line 10:

A housing case 51 of a CCU is made of a conducting material, thus realizing a shield structure against unnecessary electromagnetic waves radiated from the interior of the CCU. As shown in the sectional view of Fig. 8 and the diagram showing components to be assembled of Fig. 10, the housing case 51 has a case opening 53 bored for detachably attaching the expansion unit 52 shown in Fig. 9. A unit mount 54 into which an expansion unit 52 is fitted during mounting of the expansion unit is formed in the case opening 53. A contact connector 55 that is electrically coupled with the expansion unit 52 when the expansion unit is mounted and that transfers an electrical signal or the like to or from the expansion unit 52 is formed at the interior end of the unit mount 54.

Replacement for the paragraph beginning at page 22, line 24, through page 23, line 16:

A contact member 56 is sandwiched between the housing case 51 near the case opening 53 and the unit mount 54 so that the contact member 56 will be electrically coupled with the housing case 51. The portion of the contact member 56 bordered by the upper side and lateral sides of the case opening 53 is exposed in the opening to form a contact portion 56a. A hinge member 57 realized with a conductive member made of a metal or conducting rubber is located on the lower side of the case opening 53. One extreme portion of the hinge member 57 is fixed as a stationary portion 57a so that the portion will be electrically coupled with the housing case 51. The other extreme portion of the hinge member 57 can be opened or closed as a lid portion 58. The lid portion is constrained to move in a direction (direction of an arrow A in Fig. 8), in which it meets the contact portion 56a on the upper side of the case opening 53, by means of a spring member 59 attached to the hinge member 57.

Replacement for the two paragraphs beginning at page 23, line 17 through page 24, line 9:

Furthermore, the portion of the inner lower surface of the unit mount 54 inside the hinge member 57 is formed as a slope 60 opening toward the outside of the housing case 51.

The expansion unit 52 has, as shown in Figs. 11 and 12, a conductor 61. The conductor 61 is realized with a conductive member coated over the circumferential surfaces of a back portion of the expansion unit 52 which remains at least partially exposed when the expansion unit is inserted

into the expansion slot. When the expansion unit 52 is mounted in the expansion slot, as shown in Fig. 9, the contact portion 56a of the contact member 56 over the upper side and lateral sides of the case opening meets the conductor 61 extending over the upper and lateral surfaces of the expansion unit 52. An end of the lid portion 58 of the hinge member 57 meets the portion of the conductor 61 over the lower surface of the expansion unit 52. This causes the lid portion 58 to conduct.

Replacement for the two paragraphs beginning at page 24, line 10 through page 25, line 7:

Fig. 13 shows a variant of the expansion unit 52. An expansion unit 62 of the variant has a card slot 63 formed in a lateral surface thereof. A memory card 64 such as a PC card can be mounted in the card slot. Like the structure shown in Fig. 11, a conductor 61 is formed on the back portion of the expansion unit that remains at least partially exposed when the expansion unit is inserted.

When the expansion unit 52 is not mounted in the thus-formed expansion slot, the lid portion 58 of the hinge member 57 is constrained to move in the direction of an arrow A in Fig. 8 by means of the spring member 59. This causes the lid portion 58 to meet the contact portion 56a of the contact member 56 to thus permit electrical conduction therebetween. The lid portion 58 is positioned to block the case opening 53. Thus, the lid portion 58 of the hinge member 57 fills the role of a lid for covering the case opening 53. Liquid flowing in from, for example, the top of the housing case 51 will flow along an arrow B in Fig. 8 but will not invade directly into the interior of the unit mount 54. Moreover, liquid invading into the interior of the housing case 51 through a gap in the hinge member 57 can be prevented from invading into the interior of the unit mount 54 owing to the slope 60 of the unit mount 54.

Replacement for the two paragraphs beginning at page 25, line 8 through page 26, line 3:

Moreover, when the expansion unit 52 is mounted, the conductor 61 on the expansion unit 52, the contact portion 56a of the contact member 56, and the end of the lid portion 58 of the hinge member 57 meet, as shown in Fig. 9, to form an electrically conductive path. This disables shielding, which is intended to attain EMC, of the case opening 53. Consequently, release of unnecessary radiative noises can be prevented. At this time, since the case opening 53 is blocked by

the expansion unit 52, liquid can be prevented from invading into the interior of the unit mount 54 in the same manner as that when the expansion unit is not mounted.

Fig. 14 shows a first variant of the expansion slot of the fourth embodiment. The first variant has such a structure that a slope 65 is formed on a back portion of the expansion unit 52 that remains exposed outside the housing case 51 when the expansion unit is inserted. Owing to the slope 65, even when the expansion unit 52 is mounted, liquid flowing down from the top of the housing case 51 flows in the direction of arrow C in Fig. 13. This structure can therefore prevent invasion of liquid into the interior of the unit mount 54 more reliably than the structure shown in Fig. 9.

Replacement for the two paragraphs beginning at page 26, line 4:

Fig. 15 shows a second variant of the expansion slot of the fourth embodiment. The second variant has such a structure that bent parts 66 are formed as parts of lateral ends of the lid portion 58 of the hinge member 57. Owing to the bent parts 66, the lateral sides of the case opening 53 can meet the contact member 56 more reliably. This leads to improved effects of preventing invasion of liquid and of shielding.

Fig. 16 shows a third variant of the expansion slot of the fourth embodiment. The third variant has such a structure that a lid member 67 is formed with a resin member which is bent in the middle to substitute for the hinge member 57. A metallic film 68 is bonded to the surface of the lid member 67. Owing to the lid member 67, a mechanical gap is not created along hinge 69. Consequently, an effect of preventing invasion of liquid can be exerted more efficiently.

Replacement for the paragraph beginning at page 28, line 13:

As shown in Fig. 17, the rigid endoscope 102 includes an elongated insertion unit 121, a hand-held unit 122 formed at the proximal end of the insertion unit 121, and an eyepiece unit 123 formed at the proximal end of the hand-held unit 122. The hand-held unit 122 has a light guide base 124, and is connected to the light source apparatus 105 over a light guide cable 125.

Replacement for the paragraph beginning at page 30, line 5:

The CCD output signal input to the pre-processing circuit 133 is pre-processed by performing correlation doubling sampling (CDS) and sample-and-hold (S/H). The resultant signal is then input to an A/D converter 134 and converted into a digital signal. The digital signal is input to a digital signal processor (DSP) 135.

Replacement for the paragraph beginning at page 31, line 1:

Moreover, the CCU 107 is provided with a reference signal generator (SSG) 138. Based on a clock signal generated by the SSG 138, a timing signal generator (TG) 139 generates a timing signal. The CCD driver 131 drives the CCD 106 in response to the timing signal. The clock signal sent from the SSG 138 is also output to the pre-processing circuit 133, A/D converter 134, DSP 135, and D/A converter 136. The CCD output signal (image signal) sent from the CCD driver 131 is processed synchronously with the clock signal.

Replacement for the two paragraphs beginning at page 32, line 5, through page 33, line 3:

As shown in Fig. 18, the expansion unit 110 includes a discrimination circuit 151 for inputting an uncompressed digital video signal, to which a discrimination signal is appended by the digital interface 141, extracting the discrimination signal, appending to the uncompressed digital video signal a compressibility signal proportional to the discrimination signal, and outputting the resultant digital video signal. The expansion unit 110 further includes a compression circuit 152 for compressing an uncompressed digital video signal, to which the compressibility signal sent from the discrimination circuit is appended, at a level of compressibility indicated by the compressibility signal, and a recording unit 153 for recording the compressibility signal and digital video signal on a PC card 112 via a PC card slot 111.

The PC card 112 is divided into segments associated with a plurality of data groups, for example, patients or medical fields. Associated patient data items and medical-field data items are recorded in the segments. The discrimination circuit 151 can select a level of compressibility according to patient data or medical-field data recorded on the PC card 112, and provide a discrimination signal indicating the level of compressibility.

Replacement for the paragraph beginning at page 35, line 15 through page 36, line 2:

Then, at step S14, the compression circuit 152 compresses the digital video signal at a level of compressibility indicated by the compressibility signal. At step S15, the recording unit 153 records the resultant digital video signal on the PC card 112 together with the compressibility signal via the PC card slot 111. Thus, the compressibility signal is recorded together with the compressed digital video signal on the PC card 112. The compressed image can therefore be decompressed properly by handling a personal computer or the like when it must be reopened.

Replacement for the paragraph beginning at page 36, line 3:

The parameter used at step S12 in Fig. 19 is not limited to the number of pixels permitted by the CCD 106. Alternatively, the type of rigid endoscope 102 defined by an angular field of view permitted by the rigid endoscope may be used. In this case, the CPU 140 uses as a parameter any of a first endoscope, second endoscope, third endoscope, etc., which are sorted in that order from the smallest-diameter endoscope to the largest diameter one as shown in Table 3, to select a discrimination signal.

Replacement for the paragraph beginning at page 37, line 9:

Moreover, the discrimination signal to be read at step S13 in Fig. 19 may represent medical-field data as listed in Table 5 or patient data as listed in Table 6. Based on the data, the discrimination circuit 151 selects a level of compressibility.

Replacement for the two paragraphs beginning at page 38, line 16 through page 39, line 5:

Incidentally, the expansion unit 110 may be formed with a PC card. Moreover, the structure of the expansion unit 110 may be, as shown in Fig. 20, included in the CCU 107.

Moreover, this embodiment has been described by taking the TV camera-mounted endoscope 104, which is the rigid endoscope 102 having the TV camera 103 mounted thereon, for instance. The embodiment is not limited to this type of endoscope. Alternatively, a TV camera-mounted soft endoscope, which is a soft endoscope having the TV camera mounted thereon, or an

electronic endoscope having a CCD incorporated in a distal part of an insertion unit thereof may be used in connection with this embodiment.

Replacement for the paragraph beginning at page 39, line 19:

A plurality of endoscopes can be, as shown in Fig. 22, connected to the camera head 202. For example, a small-diameter scope 201a employed in the field of urology or the like, a large-diameter scope 201b used as a laparoscope or the like, and any other endoscope having different specifications can be alternately mounted for use on camera head 202.

Replacement for the two paragraphs beginning at page 40, line 1, through page 41, line 4:

The CCU 203 includes, as shown in Fig. 23, a CCD drive circuit 210 for driving a CCD 209 that is an imaging device incorporated in the camera head 202, a pre-processing circuit 211 for pre-processing a signal output from the CCD 209, a wave detector 212 for detecting the waveform of an output of the pre-processing circuit 211, a light adjustment control circuit 214 for sending a control signal to the CCD drive circuit 210 and a light source control circuit 213 for controlling an amount of light emanating from a light source, which is not shown, so as to adjust light. On the succeeding side of the pre-processing circuit 211, there are an AGC circuit 215 for controlling a gain automatically, a white balance circuit 216 for adjusting the white balance of an output image, a tone circuit 217 for adjusting the tone of an output image, a contour enhancement circuit 218 for enhancing the contour of an output image, and an encoder 219 for converting a video signal into a standard video signal. Thus, a video signal representing an object image is output to a monitor that is not shown.

Moreover, the CCU 203 is provided with a CPU 220 for controlling the light adjustment control circuit 214, white balance circuit 216, tone circuit 217, and contour enhancement circuit 218, a memory card driver 221 connected to the memory card 207 for driving the memory card 207 or transferring data to or from the memory card 207, and a front panel 222 having an indicator for indicating a setting for an operation and having operation switches arranged thereon.

Replacement for the paragraph beginning at page 41, line 14 through page 42, line 5:

Next, the operation of the endoscopic imaging system of this embodiment will be described. In the endoscopic imaging system of this embodiment, a video signal representing an object image is photoelectrically converted by the CCD 209 in the camera head 202, and then input to the CCU 203. The pre-processing circuit 211, AGC circuit 215, white balance circuit 216, tone circuit 217, contour enhancement circuit 218, and encoder 219 incorporated in the CCU 203 process the video signal. The object image is then displayed on the monitor, not shown in the figure. At this time, the wave detector 212 detects the waveform of an output of the CCD 209, and outputs a wave detection signal. Based on the wave detection signal, the light adjustment control circuit 214 controls the CCD drive circuit 210 and light source control circuit 213 to control light adjustment for adjusting the brightness of an image.

Replacement for the two paragraphs beginning at page 42, line 6:

With a difference in field in which an endoscope is employed, the state of an object differs, and a way of displaying a produced image and the tone of the image differ correspondingly. Adjustment values including a white balance setting value, a tone setting value, a level of enhancement, and a frequency must therefore be varied depending on an object region to be observed. The settings for an operation must thus be attained properly.

Replacement for the paragraph beginning at page 42, line 24, through page 43, line 11:

In this embodiment, a memory card 207 in which appropriate adjustment values are stored is prepared for each object field. When the endoscopic imaging system is put to use, the camera head 202 is mounted on an associated endoscope 201, and a memory card 207 associated with an intended field is inserted into the card slot 206. The CPU 220 reads setting data which represent the adjustment values stored in the memory card 207, via the memory card driver 221. The CPU 220 then sends a control signal to each of the light adjustment control circuit 214, white balance circuit 216, tone circuit 217, and contour enhancement circuit 218. Thus, various adjustment values are modified.

Replacement for the paragraph beginning at page 43, line 12:

Fig. 27 shows an example of setting data representing adjustment values in relation to object fields. For the field of urology or for the field using an arthroscope, the adjustment values are specified in order to attain a low speed of light adjustment, a low level of light adjustment, a bluish level of tone, and a high degree of contour enhancement. Moreover, for the field using a laparoscope, the adjustment values are specified in order to attain a high speed of light adjustment, a high level of light adjustment, a reddish level of tone, and a low degree of contour enhancement.

Replacement for the two paragraphs beginning at page 44, line 14:

Since settings for operations of light adjustment control, tone adjustment and contour enhancement are thus modified, the endoscopic imaging system can be set to a state suitable for a particular object field by carrying out simple handling. Endoscopic observation can therefore be carried out in an optimal operational environment at all times.

Moreover, the endoscopic imaging system of this embodiment includes an alarm means for giving an alarm to a user when an incorrect memory card inconsistent with an intended object field is inserted. The operation of the alarm means will be described in conjunction with Figs. 28 and 29.

Replacement for the three paragraphs beginning at page 45, line 1 through page 46, line 3:

The CPU 220 in the CCU 203 reads, as described in the flowchart of Fig. 28, set data representing adjustment values from the memory card 207 inserted into the card slot 206 at step S21. At step S22, a picture size for an object image is sensed according to wave detection-related information represented by an image signal output from the CCD 209. At step S23, the wave detection-related information indicating the picture size for the object image is compared with object field information corresponding to the setting data stored in the memory card 207. It is then judged whether or not the picture size agrees with a picture size specified for an object field defined by the type of connected endoscope or a region to be observed.

If the picture size agrees with the picture size specified for the object field, it is judged that a correct memory card has been inserted. Control is then passed to step S24. Subsequent setting modification or the like is carried out. By contrast, if the picture size disagrees therewith, it is

judged that an incorrect memory card has been inserted. Control is passed to step S25, whereupon an alarm display is carried out. The alarm display is, for example, such that an alarm having the contents shown in Fig. 29 is displayed in a screen of the monitor 228.

Owing to the alarm means, even when an incorrect memory card is inserted, a user can be informed of the fact and aware of incorrect use. A fear of establishing a setting state unintended by the user can be eliminated.

Replacement for the two paragraphs beginning at page 46, line 5 through page 47, line 1:

The seventh embodiment is an example in which a memory card having proper adjustment values stored thereon is prepared for each doctor, and in which settings for various operations can be modified. A memory card 207a dedicated to Dr. A shown in Fig. 30 and a memory card 207b dedicated to Dr. B shown in Fig. 31 are made available. When either of the doctors uses the endoscopic imaging apparatus, his/her own memory card is inserted into the card slot 206 of the CCU 203. Like the sixth embodiment, settings for operations of light adjustment control, tone adjustment, and contour enhancement are modified so that desired adjustment values can be specified.

For example, assuming that Dr. A likes a bright and reddish image, setting data associated with such an image is stored on the memory card 207a. Specifically, the brightness of the image is set to a higher level and the tone thereof is set to a reddish level. Moreover, assuming that Dr. B likes a dark and bluish image setting data associated with such an image is stored on the memory card 207b. Specifically, the brightness of the image is set to a lower level and the tone thereof is set to a bluish level.

Replacement for the two paragraphs beginning at page 47, line 2 through page 48, line 2:

In the conventional system, a setting menu screen shown in Fig. 46 is displayed on the monitor or the like. Settings of tone and brightness are modified for each doctor. Handling for setting modification is therefore rather a nuisance. Moreover, an amount of data representing adjustment values which can be stored is limited because of the storage capacity of a memory. This leads to drawback that many setting items cannot be stored. In contrast, according to this

embodiment, a setting for an operation concerning a desired item can be readily modified merely by inserting a memory card. Thus, the item can be set to an optimal value. Settings desired by a doctor can be attained by performing simple handling. Thus, a state suitable for a user can be established by performing simple handling, and endoscopic observation can be achieved under an optimal operational environment at all times.

According to the foregoing embodiment, simple handling or insertion of an associated memory card should merely be carried out according to a use situation, i.e., an object field relevant to an endoscopic examination or a doctor in charge thereof. Thus, proper adjustment values can be set in various adjusting means for carrying out light adjustment control, tone adjustment, and contour enhancement. A proper operational environment can be established readily.

Replacement for the paragraph beginning at page 48, line 24 through page 49, line 9:

As shown in Fig. 32, an endoscopic imaging system 301 of this embodiment comprises a camera head 302 having an imaging means incorporated therein, a scope 303 connected to the camera head 302, a light source apparatus 304 for supplying illumination light to the scope 303, a camera control unit (hereinafter a CCU) 305 for processing a signal sent from the imaging means in the camera head 302, and a TV monitor 306 for displaying a standard video signal processed by the CCU 305. The scope 303 is a rigid endoscope such as a laparoscope used for, for example, a surgical procedure in the field of surgery.

Replacement for the two paragraphs beginning at page 49, line 10 through page 50, line 11:

When the endoscope imaging system 301 is put to use, a light guide 308 of the scope 303 is, as shown in Fig. 32, linked to the light source apparatus 304. Illumination light emanating from a lamp in the light source apparatus 304 passes through a diaphragm that is not shown, is converged by a lens, and falls on an opposing end surface of the light guide 308. The illumination light is transmitted to the scope 303 over the light guide 308, propagated through the scope, and emitted forward through the distal end of the scope 303. An object such as a patient's body cavity is then illuminated. An image represented by light reflected from the illuminated object is formed by the

scope 303. The object image is projected by the imaging means in the camera head 302 through the scope 303.

A CCD 307 serving as the imaging means is located on the focal plane of an imaging lens in the camera head 302. The object image is formed on the image plane of the CCD 307 and converted photoelectrically. The CCD 307 is connected to the CCU 305 via a camera cable 309 in which a CCD driving signal transmission line and a CCD output signal transmission line are inserted. An output signal of the CCD 307 is sent to CCU 305 and subjected to various kinds of signal processing. A video signal output from the CCU 305 is sent to the TV monitor 306. A view image of the object is then displayed on the TV monitor 306.

Replacement for the paragraph beginning at page 50, line 25, through page 51, line 8:

On a succeeding side of the pre-processing circuit 312, there are an A/D converter 313 and a Y/C separation circuit 314. A CCD output signal input to the pre-processing circuit 312 is pre-processed by performing correlation double sample (CDS) and sample-and-hold (S/H). The resultant signal is then input to the A/D converter 313 and converted into a digital signal. The digital signal is then input to the Y/C separation circuit 314.

Replacement for the two paragraphs beginning at page 51, line 9 through page 52, line 6:

On a succeeding side of the Y/C separation circuit 314, there are an RGB matrix circuit 315 and a white balance/black balance adjustment circuit 316. A digital signal input to the Y/C separation circuit 314 is recomposed in conformity with the line sequential system. Digital signal Y, CR, and CB to be propagated through three channels are separated from one another, and input to the RGB matrix circuit 315. The digital signals are then converted into an RGB digital signal. Thereafter, the white balance/black balance adjustment circuit 316 adjusts the white balance and black balance of the signal.

On a succeeding side of the white balance/black balance adjustment circuit 316, there are a digital video processing circuit 317, a D/A converter 318, and a post-processing circuit 319. An RGB digital signal whose balance has been adjusted is digitally processed through enhancement, gamma correction, and character convolution performed by the digital video processing circuit 317.

Thereafter, the signal is converted into an analog signal by the D/A converter 318, and then input to the post-processing circuit 319. The analog signal that is input to the post-processing circuit 319 is converted into a standard video signal and output to the TV monitor 306.

Replacement for the two paragraphs beginning at page 52, line 7 through page 53, line 2:

On the succeeding side of the digital video processing circuit 317, there are a memory 320, a JPEG compression circuit 321, and a PC card driver 322. A PC card slot 323 is connected to the PC card driver 322. A digital signal having undergone various kinds of signal processing is stored in the memory 320. A PC card 324 having a memory incorporated therein is mounted in the PC card slot 323. After a digital image signal read from the memory 320 is compressed by the JPEG compression circuit 321, it is recorded on the PC card 324 via a PC card driver 322.

Furthermore, the CPU 325 responsible for various kinds of control including control of recording an image on the PC card 324, a connection sensing means 326 for sensing the connected state of the PC card 324, and a character generator 327 for outputting medium information that includes the recorded quantity of image data on the PC card 324 and appears as a display on monitor 306 screen are included in the CCU 305. A release switch 329 used to give a handling instruction (release instruction) for image recording is formed on the front panel 328 of the CCU 305.

Replacement for the paragraph beginning at page 54, line 21 through page 55, line 5:

During image recording, the CPU 325 reads information of a storage capacity for image data on the PC card 324 and information of the connected state of the PC card 324 sensed by the connection sensing means 326. Information of the image data recorded on the medium is output. The connected state of the PC card 324 is sensed by checking a high-level or low-level signal that is output from the connection sensing means 326 according to whether or not the PC card 324 is inserted in the PC card slot 323.

Replacement for the two paragraphs beginning at page 56, line 1:

When an endoscopic image is thus recorded using a PC card, a still image having little deterioration can be recorded and stored at low cost. Moreover, when the image is recorded,

medium information such as the recording capacity of image data on the PC card can be superimposed on a view image on a monitor. A user can therefore recognize the connected state of the PC card and the number of remaining recordable images readily.

When digital image data is compressed and recorded on a medium such as a PC card, the number of remaining recordable images varies depending on a level of compressibility of data or a storage capacity on a medium. It is therefore hard for a user to grasp the recording capacity of image data. According to this embodiment, medium information can be checked accurately. It can be prevented that recording a necessary image fails because of imperfect connection of the PC card or an insufficient storage capacity.

Replacement for the paragraph beginning at page 56, line 23 through page 57, line 5:

As shown in Fig. 37, the CCU 305 has, in addition to the components of the eighth embodiment shown in Fig. 32, and LCD 345 formed on the front panel thereof. The CCU 305 also has an LCD driver 346 for driving the LCD 345 therein. The LCD driver 346 is connected to the CPU 325 and character generator 327. Character information of medium information generated by the character generator 327 is displayed on the LCD 345.

Replacement for the two paragraphs beginning at page 57, line 6:

The components of this embodiment other than the components relevant to display of medium information and the operation thereof are identical to those of the eighth embodiment. The description of those components will thus be omitted.

During image recording, the CPU 325 reads information of a storage capacity for image data on the PC card 324 and information of the connected state of the PC card sensed by the connection sensing means 326 in the same manner as that of the eighth embodiment. The number of recordable images or the like is then calculated. The information of the image data recording capacity on the medium is then output. Medium information such as the number of recordable images output from the character generator 327 is output as character information from the character generator 327 to the LCD driver 346. The medium information is displayed on the LCD 345 on the front panel of the CCU 305.

Replacement for the paragraph beginning at page 58, line 8:

Medium information such as the recording capacity of image data on a PC card is displayed on the front panel of a CCU or the like separately from a view image on a monitor. A user can therefore recognize the connected state of the PC card and the number of remaining recordable images as readily as he/she can in the eighth embodiment. Moreover, according to the ninth embodiment, an endoscopic image alone is displayed on the monitor. The display of medium information will not hinder viewing of an endoscopic image. The user can recognize the state of a medium any time without hampering observation or surgery.

Replacement for the two paragraphs beginning at page 58, line 21 through page 59, line 8:

The tenth embodiment is an example of a configuration including an alarm means for displaying medium information only when it is needed and for giving an alarm to a user.

The CCU 305 has, in addition to the components of the eighth embodiment shown in Fig. 32, as shown in Fig. 39, a loudspeaker 351 for alarming. The loudspeaker 351 is connected to a loudspeaker driver 352 for converting a notification signal output from the CPU 325 into a voice signal. The components of the tenth embodiment other than the components relevant to the alarming means are identical to those of the eighth embodiment. The description of those components will thus be omitted.

Replacement for the two paragraphs beginning at page 59, line 9 through page 60, line 4:

According to the tenth embodiment, when needed, or specifically, when the PC card 324 is not mounted normally or the number of remaining images recordable on the PC card 324 becomes zero, medium information is also displayed or superimposed on an image in a screen on the TV monitor 306. Thus, a user's attention is called.

The CPU 325 calculates the number of recordable images using information of a storage capacity for image data on the PC card 324, and information of the connected state of the PC card 324 sensed by the connection sensing means 326. When it is necessary to inform a user of medium information, for example, when image recording cannot be achieved normally, the medium information is output to the character generator 327. At the same time, a notification signal is

output to the loudspeaker driver 352. The medium information sent from the CPU 325 is output as character information from the character generator 327 and superimposed on an image in a screen on the TV monitor 306. In addition, an audio message saying, for example, "Replace the PC card with a new one," is uttered by the loudspeaker 351.

Replacement for the paragraph beginning at page 60, line 17 through page 61, line 2:

As mentioned above, only when medium information such as the recorded image data on the PC card is needed, it is superimposed on view image on the monitor or a voice is uttered. A user can therefore recognize the connected state of the PC card or the recorded state of image data readily at an appropriate time without discontinuing observation or hampering surgery. Thus, a failure in recording an image, the loss of a necessary image due to overwriting of a recorded image, or any other mistake can be prevented from being made during image recording.

Replacement for the paragraph beginning at page 61, line 14:

The CCU 305 has, in addition to the components of the eighth embodiment shown in Fig. 41, a JPEG stretch circuit 355 connected in parallel to the JPEG compression circuit 321 between the PC card driver 322 and memory 320. The JPEG stretch circuit 355 processes data by reversing the procedure followed by the JPEG compression circuit 321. In other words, the JPEG stretch circuit 355 stretches image data that has been encoded to be compressed, and thus restores it to original image data. The components other than the components relevant to the reproducing means are identical to those of the eighth embodiment. The description of those components will therefore be omitted.

Replacement for the paragraph beginning at page 62, line 1:

For reproducing image data of a still image recorded on the PC card 324, image data is read from the PC card 324 via the PC card driver 322 in response to an instruction sent from the CPU 325. The image data is stretched by the JPEG stretch circuit 355, and then stored in the memory 320. The stretched image data is read from the memory 320, and converted into a standard video

signal by the D/A converter 318 and post-processing circuit 319. The resultant image data is output to and displayed on the TV monitor 306.

Replacement for the paragraph beginning at page 62, line 15:

Since a still image recorded on a PC card can thus be displayed, a user can check if the recorded image is necessary. Consequently, unnecessary images can be identified and deleted. A larger number of necessary images can be recorded on the PC card. Moreover, a PC card must be replaced with another at a reduced frequency during an endoscopic examination. The labor of replacing a medium with another can be minimized, and the cost required for the running of a medium can be reduced.

Replacement for the paragraph beginning at page 62, line 25, through page 63, line 2:

The twelfth embodiment is an example of a configuration including an LED for displaying a releasing count on the front panel of a CCU.

Replacement for two paragraphs beginning at page 63, line 3 through page 64 line 2:

CCU 305 has, in addition to the components of the eighth embodiment shown in Fig. 32, as shown in 43, an LED 361 for displaying numerals, such as a seven-segment display formed on the front panel thereof. Moreover, a font generator 362 for driving the LED 361 for display is incorporated in the CCU 305. The font generator 362 is connected to the CPU 325. Based on information concerning release performed during image recording which is output from the CPU 325, information of a releasing count is indicated with numerals on the LED 361. The components of the twelfth embodiment other than the components relevant to display of the releasing count are identical to those of the eighth embodiment. The description of those components will thus be omitted.

When the release switch 329 is pressed in order to record an endoscopic image, the CPU 325 sends a release signal to the memory 320. Image data of a still image is then read from the memory 320. The read image data is compressed by the JPEG compression circuit 321, and sent to and recorded on the PC card 324 mounted on the PC card slot 323 via the PC card driver 322. At this

time, the CPU 325 sends release information to the font generator 362, and numerals indicating a releasing count are displayed on the LED 361. The releasing count is incremented by one with every release.

Replacement for the paragraph beginning at page 64, line 3:

As mentioned above, a display means for displaying medium information concerning the number of images that are represented by image data and recordable on the PC card is formed on the front panel of a CCU or the like. A user can therefore readily recognize recording data such as the number of remaining images recordable on the PC card.

Replacement for the paragraph beginning at page 64, line 25, through page 65, line 4:

Moreover, the PC card slot to which a PC card is connected is not limited to a structure formed on the front panel of a CCU. Alternatively, a structure provided separately from the CCU and detachably attached thereto may be used in connection with the present invention.

Replacement for the paragraph beginning at page 65, line 5:

According to the present invention, it is apparent that a wide range of different embodiments can be constructed without a departure from the spirit and scope of the present invention. This invention is limited by the appended claims but not restricted to any specific embodiments described herein.

CLAIMS (with indication of amended or new):

11. (Amended) An endoscopic imaging system, comprising:

an imaging device for projecting an object image of an object inside a body cavity;

a digital signal converter for converting an image signal sent from said imaging means into a digital signal;

a signal processor for processing said digital signal sent from said digital signal converter;

a discriminating signal appending circuit for appending a discrimination signal to said digital signal processed by said signal processor;

a compression circuit for determining a level of compressibility according to said discrimination signal appended by said discrimination signal appending circuit, and for compressing said digital signal processed by said signal processor; and

a recording unit for recording said digital signal compressed by said compression circuit on a recording medium.

12. (Amended) An endoscopic imaging system according to claim 11, wherein said discrimination signal is produced according to at least one of a type of imaging device, a type of endoscope, a level of enhancement performed by said signal processor, and data recorded in advance on said recording medium.

13. (Amended) An endoscopic imaging system according to claim 12, wherein said data recorded in advance on said recording medium is medical-field data or patient data.

31. (New) An endoscopic imaging system comprising:

an imaging means for projecting an object image; and

a signal processing means for processing an image signal outputted from said imaging means,

wherein said signal processing means comprises:

a signal processing circuit for processing said image signal outputted from said imaging means to produce a digital signal;

a discrimination signal appending circuit for appending a given discrimination signal to said digital signal produced by said signal processing circuit;

a compressing circuit for determining a level of compressibility according to said discrimination signal appended by said discrimination signal appending circuit; and

compressing said digital signal produced by said signal processing means; and

a recording circuit for recording said digital signal compressed by said compressing circuit on a recording medium.

APPENDIX B

VERSION WITH MARKINGS TO SHOW CHANGES MADE
37 C.F.R. § 1.121(b)(iii) AND (c)(ii)

SPECIFICATION:

On page 1, between the title and the section heading "Background of the Invention", please insert the following paragraph:

This application is a divisional application of Serial No. 09/120,559, filed July 22, 1998. Priority is claimed under 35 U.S.C. §119 based on Japanese Application Nos. H9-197114, filed July 23, 1997; H9-201565 filed July 28, 1997; H9-206679, filed July 31, 1997 and H9-208123, filed August 1, 1997.

Replacement for the two paragraphs beginning at page 2, line 1:

An endoscopic image projected by an endoscopic imaging system may be recorded for use in a clinical record or thesis. In this case, generally, the image has been filmed as a photograph in the past. Alternatively, the image has been recorded as a motion picture on videotape by means of a VTR, or recorded as digital image data on an information-recording device such as a hard disk. Recently, a PC card having a memory incorporated as a card-shaped compact portable recording medium therein has [called people's attention] become popular.

A conventional endoscopic imaging system has not been designed so that a freely-detachable compact portable recording medium such as a PC card or any other expansion unit that has an external expansion [facility] capability can be detachably attached to a main processor unit such as a camera control unit. If a medium can be mounted directly in the main processor unit, it would be quite convenient for reading image data on the PC card or the like and help expand the capability of the system readily. However, as far as the conventional system is concerned, an expansion slot in which the expansion unit is mounted must be included separately. This may lead to a complex system configuration and time-consuming handling and invite an increase in cost.

Replacement for the two paragraphs beginning at page 4, line 8 through page 5, line 9:

For coping with the various use situations, a technology has been disclosed in, for example, Japanese Unexamined Patent Publication No. 7-194527. Herein, a ROM in which [set] setting data

is stored is incorporated in an endoscope. A control unit reads the [set] setting data, and modifies a sequence of controlling light adjustment or the like. However, a rigid scope employed in a surgical procedure and a camera head included in an endoscopic imaging system may be used in combination. A plurality of types of endoscopes may be attached to the camera head. There is difficulty in storing the [set] setting data in the endoscopes. Even when the camera head is provided with a ROM for storing the [set] setting data, it is rather meaningless.

As mentioned above, a ROM in which [set] setting data is stored is incorporated in an endoscope, and a control unit references the [set] setting data to modify a setting for an operation such as light adjustment. Thus, the conventional system is adjusted to specifications for endoscopes that are different from field to field, situations of objects, and other different use situations. However, an endoscope system may be constructed by combining an optical endoscope such as a rigid scope and a camera head included in an endoscopic imaging system. In this case, there are problems in that it is hard to store [set] setting data in the endoscope, and a setting for an operation such as light adjustment cannot be modified according to a use situation.

Replacement for the paragraph beginning at page 5, line 10:

Moreover, when the conventional endoscopic imaging system is employed, a produced endoscopic image may be recorded on a compact portable recording medium[,] which is freely attachable and detachable, such as a PC card. In this case, the recorded situation of image data on the medium is unclear to a user. This may result in such a drawback that necessary image data cannot be recorded or stored reliably[, that]. That is, an image cannot be recorded because of insufficient capacity, or previously recorded image data is overwritten. Moreover, if the [connected state of a] PC card is [imperfect] improperly inserted or connected, recording of an image may fail.

Replacement for the section heading at page 5, line 22:

[OBJECTS AND] SUMMARY OF THE INVENTION

Replacement for the paragraph beginning at page 5, line 23 through page 6, line 3:

An [object] aspect of the present invention is to provide an endoscopic imaging system making it possible to detachably attach an expansion unit[,] which has an external expansion [facility,] to a main unit, and to readily add an expansion facility for improving the capability of the system.

Replacement for the four paragraphs beginning at page 6, line 4 through page 7, line 3:

Another [object] aspect of the present invention is to provide an endoscopic imaging system making it possible to automatically compress an endoscopic image at an optimal level of compressibility, and to thus improve the use efficiency of a recording medium.

Still another [object] aspect of the present invention is to provide an endoscopic imaging system making it possible to readily achieve a proper setting for an operation according to a use situation.

Yet another [object] aspect of the present invention is to provide an endoscopic imaging system making it possible to readily check the recorded situation of image data on a medium, and to thus prevent occurrence of an error during image recording.

In an endoscopic imaging system according to the present invention, a main processor unit including a signal processing means for processing a video signal representing an object image projected by an imaging means is provided with an expansion slot to which an expansion unit having an external expansion [facility] capability is freely detachably connected. When an expansion unit having an external expansion [facility] capability is detachably attached to the main unit, the expansion facility can be added to the system readily. Thus, the capability of the system can be improved.

Replacement for the paragraph beginning at page 7, line 8:

Figs. 1 and 3 relate to [the] a first embodiment of the present invention;

Replacement for the paragraph beginning at page 7, line 18:

Figs. 4 and 5 relate to [the] a second embodiment of the present invention;

Replacement for the paragraph beginning at page 7, line 23:

Figs. 6 and 7 relate to [the] a third embodiment of the present invention;

Replacement for the paragraph beginning at page 8, line 5:

Figs. 8 to 16 relate to [the] a fourth embodiment of the present invention;

Replacement for the paragraph beginning at page 9, line 4:

Figs. 17 to 20 relate to [the] a fifth embodiment of the present invention;

Replacement for the paragraph beginning at page 9, line 14:

Figs. 21 to 29 relate to [the] a sixth embodiment of the present invention;

Replacement for the paragraph beginning at page 10, line 6:

Fig. 27 is an explanatory diagram showing an example of [set] setting data representing adjustment values associated with various fields;

Replacement for the paragraph beginning at page 10, line 9:

Fig. 28 is a flowchart describing an [alarming] alarm operation to be carried out when an incorrect memory card is inserted;

Replacement for the paragraph beginning at page 10, line 14:

Figs. 30 and 31 relate to [the] a seventh embodiment of the present invention;

Replacement for the paragraph beginning at page 10, line 22:

Figs. 32 to 36 relate to [the] an eighth embodiment of the present invention;

Replacement for the paragraph beginning at page 11, line 9:

Figs. 37 and 38 relate to [the] a ninth embodiment of the present invention;

Replacement for the paragraph beginning at page 11, line 16:

Figs. 39 and 40 relate to [the] a tenth embodiment of the present invention;

Replacement for the paragraph beginning at page 11, line 22:

Figs. 41 and 42 relate to [the] an eleventh embodiment of the present invention;

Replacement for the paragraph beginning at page 12, line 3:

Figs. 43 and 44 relate to [the] a twelfth embodiment of the present invention;

Replacement for the paragraph beginning at page 12, line 9:

Fig. 45 is an explanatory diagram for [explaining] demonstrating a drawback of a conventional system that when liquid such as water is spilled over a CCU, the liquid invades into the interior of an expansion slot; and

Replacement for the paragraph beginning at page 12, line 18:

As shown in Fig. 1, an endoscopic imaging system 1 of this embodiment comprises a camera head 2 having an imaging means incorporated therein, a scope 3 connected to the camera head 2, a light source apparatus 4 for supplying illumination light to the scope 3, a camera control unit 5 (hereinafter a CCU) serving as a main processor unit for processing a signal sent from the imaging means incorporated in the camera head 2, and a TV monitor 6 for displaying a standard video signal processed by the CCU 5. The scope 3 is a rigid endoscope such as a laparoscope used for, for example, a surgical procedure in the field of surgery.

Replacement for the two paragraphs beginning at page 13, line 6, through page 14, line 6:

When the endoscope imaging system 1 is in use, a light guide 8 of the scope 3 is, as shown in Fig. 1, linked to the light source apparatus 4. Illumination light emanating from a lamp in the light source apparatus 4 passes through a diaphragm that is not shown, is converged by a lens, and falls on the [opposed] opposing end surface of the light guide 8. The illumination light is transmitted to the scope 3 over the light guide 8, passes through the scope 3, and is emitted forward

through the distal end of the scope 3. Thus, an object in a patient's body cavity or the like is illuminated. An image represented by light reflected from the illuminated object is formed by the scope 3. A resultant object image is projected by the imaging means in the camera head 2 through the scope 3.

A CCD 7 serving as the imaging means is located on the focal plane of an imaging lens in the camera head 2. The object image is formed on the image plane of the CCD 7, and photoelectronically converted. The CCD 7 is connected to the CCU 5 [over] by a camera cable 9 having a CCD driving signal transmission line and CCD output signal transmission line inserted therein. An output signal of the CCD 7 is sent to the CCU 5, and subjected to various kinds of signal processing. A video signal output from the CCU 5 is sent to the TV monitor 6. A view image of the object is then displayed on the TV monitor 6.

Replacement for the paragraph beginning at page 14, line 19:

On the succeeding [stage] side of the pre-processing circuit 12, there are an A/D converter 13 and Y/C separation circuit 14. The CCD output signal input to the pre-processing circuit 12 is pre-processed by carrying out correlation double sampling (CDS) and sample-and-hold (S/H). The resultant CCD output signal is input to the A/D converter 13 and converted into a digital signal, and then input to the Y/C separation circuit 14.

Replacement for the two paragraphs beginning at page 15, line 2:

On the succeeding [stage] side of the Y/C separation circuit 14, there are an RGB matrix circuit 15 and a white balance/black balance adjustment circuit 16. The digital signal input to the Y/C separation circuit 14 is recomposed according to the line-sequential system. Three digital signals Y, CR, and CB propagating through different channels and constituting the digital signal are then separated from one another, input to the RGB matrix circuit 15, and converted into an RGB digital signal. Thereafter, the white balance/black balance adjustment circuit 16 adjusts the white balance and black balance of the RGB digital signal.

On the succeeding [stage] side of the white balance/black balance adjustment circuit 16, there are a digital video processing circuit 17, a D/A converter 18, and a post-processing circuit 19.

The RGB digital signal having undergone balance adjustment is digitally processed through enhancement, gamma correction, and character convolution carried out by the digital video processing circuit 17. Thereafter, the resultant signal is converted into an analog signal by the D/A converter 18, and then input to the post-processing circuit 19. The analog signal that is input to the post-processing circuit 19 is converted into a standard video signal, and then output to the TV monitor 6.

Replacement for the two paragraphs beginning at page 16, line 2:

Moreover, on the succeeding [stage] side of the digital video processing circuit 17, there are a memory 20, a JPEG compression circuit 21, and a PC card driver 22. A PC card slot 23 is connected to the PC card driver 22. The digital signal having undergone various kinds of signal processing is stored in the memory 20. A PC card 24 having a memory incorporated therein is mounted in the PC card slot 23. A digital image signal read from the memory 20 is compressed by the JPEG compression circuit 21, and then recorded on the PC card 24 via the PC card driver 22.

Furthermore, the CCU 5 is provided with a CPU 25 responsible for various kinds of control including control of image recording on the PC card 24, and a font generator 26 for outputting a display of medium information including the number of image data items recordable on the PC card 24. Located on the front panel 28 of the CCU 5 are a release switch 29 used to [given] provide a handling instruction (release instruction) for image recording and an LED 27 for displaying the medium information.

Replacement for the paragraph beginning at page 17, line 2:

In the endoscopic imaging system 1 having the foregoing components, an image signal produced by the scope 3 and visualized and processed by the camera head 2 is output to the TV monitor 6 and displayed in the form of an image. [Besides] Additionally, the image signal is stored in the memory 20.

Replacement for the paragraph beginning at page 17, line 15:

Moreover, for image recording, medium information including the [frequency] quantity of [releasing] released image data representing a still image, [that is] i.e., the number of image data items recorded on the PC card 24 is sent from the CPU [20] 25 to the font generator 26. The font generator 26 outputs the information as character information. The character information is then displayed in the LED 27 for displaying medium information on the front panel. The [releasing frequency] quantity is indicated with numerals in the LED 27 and is incremented by one with every release.

Replacement for the paragraph beginning at page 17, line 25 through page 18, line 7:

When an endoscopic image is thus recorded using the PC card, recording and storage of a still image [whose quality has] with little [deteriorated] quality deterioration can be [realized easily] easily realized and at low cost. Thus, medium information including the number of image data items recorded on the PC card is displayed in the LED on the front panel of the CCU. This allows a user to readily check the number of remaining recordable images.

Replacement for the paragraph beginning at page 18, line 14:

Fig. 3 shows a variant of an endoscopic imaging system whose capability can be expanded. In the CCU 5 of this variant, a PC card 35 to which a remote control unit 34 can be connected is detachably attached to the PC card slot 23 in the front panel. The remote control unit 34 has a CPU[,] which controls remote control-related facilities on a centralized basis and is independent of the CPU in the CCU 5, incorporated therein. When the remote control unit 34 is plugged into a remote control terminal 36 of the PC card 35, the CCU 5 or the like can be handled and controlled using the remote control unit 34.

Replacement for the paragraph beginning at page 19, line 1:

In other words, the remote control unit is connected to the PC card slot 23 [instead of] via the PC card for recording image data as described in conjunction with the previous embodiment. Thus, control signals or the like can be transferred via a digital input/output interface in the slot.

Replacement for the two paragraphs beginning at page 19, line 13 through page 20, line 8:

An expansion unit to which the remote control unit is connected is not limited to [the] a PC card. The remote control unit may be connected to any other expansion unit that can be [detachable] detachably attached to the CCU. Otherwise, a CPU or the like may be incorporated in an expansion unit itself so that the remote control facilities can be installed in the CPU.

In this embodiment, an expansion slot in which an expansion unit is mounted is formed in a main processor unit included in an endoscopic imaging system. The expansion unit intended for external expansion [of] capability, for example, a compact portable recording medium[,] which is freely detachable and attachable, such as a PC card, can be detachably attached to the expansion slot. In this case, liquid may be [split] spilled over the main processor unit because of user's carelessness during an examination or surgical procedure. The liquid may then invade into the expansion slot. This would bring about a short circuit between electrical contacts or corrosion in the main processor unit. A structure for preventing invasion of liquid is therefore needed.

Replacement for the paragraph beginning at page 20, line 22:

Figs. 4 and 5 show a structure of an expansion slot in accordance with [the] a second embodiment of the present invention. Fig. 4 is a front view and Fig. 5 is a sectional view.

Replacement for the paragraph beginning at page 21, line 9:

According to the second embodiment, invasion of liquid into the expansion slot can be prevented by a simple structure. [Eventually] Thus, the fear of causing a short circuit between electrical contacts and corrosion in the CCU, can be eliminated.

Replacement for the paragraph beginning at page 21, line 15:

In [the] a third embodiment, as shown in Fig. 6, a slope 44 is formed as part of an inner lower surface of an expansion slit 41 near the opening of the expansion slot. Owing to the slope 44, invasion of liquid into the expansion slot can be prevented as indicated with an arrow 43. Moreover, in a variant shown in Fig. 7, the whole expansion slot 41 may be formed on a slope 45. The same operation and advantage as those mentioned above can still be exerted.

Replacement for the paragraph beginning at page 22, line 1:

[Besides, like] As with the second embodiment, invasion of liquid into the expansion slot can be prevented [despite the] with a simple structure.

Replacement for the paragraph beginning at page 22, line 10:

A housing case 51 of a CCU is made of a conducting material, thus realizing a shield structure against unnecessary electromagnetic waves radiated from the interior of the CCU. As shown in the sectional view of Fig. 8 and the diagram showing components to be assembled of Fig. 10, the housing case 51 has a case opening 53 bored for detachably attaching the expansion unit 52 shown in Fig. 9. A unit mount 54 into which an expansion unit 52 is fitted during mounting of the expansion unit is formed in the case opening 53. A contact connector 55 that is electrically coupled with the expansion unit 52 when the expansion unit is mounted and that transfers an electrical signal or the like to or from the expansion unit 52 is formed at the [deep] interior end of the unit mount 54.

Replacement for the paragraph beginning at page 22, line 24, through page 23, line 16:

A contact member 56 is sandwiched between the housing case 51 near the case opening 53 and the unit mount 54 so that the contact member 56 will be electrically coupled with the housing case 51. The portion of the contact member 56 bordered by the upper side and lateral sides of the case opening 53 is [jutting to be] exposed in the opening to form a contact portion 56a. A hinge member 57 realized with a conductive member made of a metal or conducting rubber is located on the lower side of the case opening 53. One extreme portion of the hinge member 57 is fixed as a stationary portion 57a so that the portion will be electrically coupled with the housing case 51. The other extreme portion of the hinge member 57 can be opened or closed as a lid portion 58. The lid portion is constrained to move in a direction (direction of an arrow A in Fig. 8), in which it meets the contact portion 56a on the upper side of the case opening 53, by means of a spring member 59 attached to the hinge member 57.

Replacement for the two paragraphs beginning at page 23, line 17 through page 24, line 9:

Furthermore, the portion of the inner lower surface of the unit mount 54 inside the hinge member 57 is formed as a slope 60 opening [on] toward the outside of the housing case 51.

The expansion unit 52 has, as shown in Figs. 11 and 12, a conductor 61. The conductor 61 is realized with a conductive member coated over the circumferential surfaces of a back portion of the expansion unit 52 which [comes back] remains at least partially exposed when the expansion unit is inserted into the expansion slot. When the expansion unit 52 is mounted in the expansion slot, as shown in Fig. 9, the contact portion 56a of the contact member 56 over the upper side and lateral sides of the case opening meets the conductor 61 extending over the upper and lateral surfaces of the expansion unit 52. An end of the lid portion 58 of the hinge member 57 meets the portion of the conductor 61 over the lower surface of the expansion unit 52. This causes the lid portion 58 to conduct.

Replacement for the two paragraphs beginning at page 24, line 10 through page 25, line 7:

Fig. 13 shows a variant of the expansion unit 52. An expansion unit 62 of the variant has a card slot 63 formed in a lateral surface thereof. A memory card 64 such as a PC card can be mounted in the card slot. Like the structure shown in Fig. 11, a conductor 61 is formed on the back portion of the expansion unit that [comes back] remains at least partially exposed when the expansion unit is inserted.

When the expansion unit 52 is not mounted in the thus-formed expansion slot, the lid portion 58 of the hinge member 57 is constrained to move in the direction of an arrow A in Fig. 8 by means of the spring member 59. This causes the lid portion 58 to meet the contact portion 56a of the contact member 56 [and] to thus [conduct] permit electrical conduction therebetween. The lid portion 58 is positioned to block the case opening 53. Thus, the lid portion 58 of the hinge member 57 fills the role of a lid for covering the case opening 53. Liquid flowing in from, for example, the top of the housing case 51 will flow along an arrow B in Fig. 8 but will not invade directly into the interior of the unit mount 54. Moreover, liquid invading into the interior of the housing case 51 through a [chink] gap in the hinge member 57 can be prevented from invading into the interior of the unit mount 54 owing to the slope 60 of the unit mount 54.

Replacement for the two paragraphs beginning at page 25, line 8 through page 26, line 3:

Moreover, when the expansion unit 52 is mounted, the conductor 61 on the expansion unit 52, the contact portion 56a of the contact member 56, and the end of the lid portion 58 of the hinge member 57 meet, as shown in Fig. 9, to [conduct] form an electrically conductive path. This disables shielding, which is intended to attain EMC, of the case opening 53. Consequently, release of unnecessary radiative noises can be prevented. At this time, since the case opening 53 is blocked by the expansion unit 52, liquid can be prevented from invading into the interior of the unit mount 54 in the same manner as that when the expansion unit is not mounted.

Fig. 14 shows [the] a first variant of the expansion slot of the fourth embodiment. The first variant has such a structure that a slope 65 is formed on a back portion of the expansion unit 52 that [comes back] remains exposed outside the housing case 51 when the expansion unit is inserted. Owing to the slope 65, even when the expansion unit 52 is mounted, liquid flowing [in] down from the top of the housing case 51 flows in the direction of [an] arrow C in Fig. 13. This structure can therefore prevent invasion of liquid into the interior of the unit mount [53] 54 more reliably than the structure shown in Fig. 9.

Replacement for the two paragraphs beginning at page 26, line 4:

Fig. 15 shows [the] a second variant of the expansion slot of the fourth embodiment. The second variant has such a structure that bent parts 66 are formed as parts of lateral ends of the lid portion 58 of the hinge member 57. Owing to the bent parts 66, the lateral sides of the case opening 53 can meet the contact member 56 more reliably. This leads to improved effects of preventing invasion of liquid and of shielding.

Fig. 16 shows [the] a third variant of the expansion slot of the fourth embodiment. The third variant has such a structure that a lid member 67 is formed with a resin member [and] which is bent in the middle [is substituted] to substitute for the hinge member 57. A metallic film 68 is bonded to the surface of the lid member 67. Owing to the lid member 67, a mechanical [chink] gap is not created [in a] along hinge 69. Consequently, an effect of preventing invasion of liquid can be exerted more efficiently.

Replacement for the paragraph beginning at page 28, line 13:

As shown in Fig. 17, the rigid endoscope 102 includes an elongated insertion unit 121, a hand-held unit 122 formed at the [back] proximal end of the insertion unit 121, and an eyepiece unit 123 formed at the [back] proximal end of the hand-held unit 122. The hand-held unit 122 has a light guide base 124, and is connected to the light source apparatus 105 over a light guide cable 125.

Replacement for the paragraph beginning at page 30, line 5:

The CCD output signal input to the pre-processing circuit 133 is pre-processed by performing correlation doubling sampling (CDS) and sample-and-[hole] hold (S/H). The resultant signal is then input to an A/D converter 134 and converted into a digital signal. The digital signal is input to a digital signal processor (DSP) 135.

Replacement for the paragraph beginning at page 31, line 1:

Moreover, the CCU 107 is provided with a reference signal generator (SSG) 138. Based on a clock signal generated by the SSG 138, a timing signal generator (TG) 139 generates a timing signal. The CCD driver 131 drives the CCD 106 in response to the timing signal. The clock signal sent from the SSG 138 is also output to the pre-processing circuit 133, A/D converter 134, DSP 135, and D/A converter 136. The CCD output signal (image signal) sent from the CCD driver 131 is processed synchronously with the clock signal.

Replacement for the two paragraphs beginning at page 32, line 5, through page 33, line 3:

As shown in Fig. 18, the expansion unit 110 includes a discrimination circuit 151 for inputting an uncompressed digital video signal, to which a discrimination signal is appended by the digital interface 141, extracting the discrimination signal, appending to the uncompressed digital video signal a compressibility signal proportional to the discrimination signal [to the uncompressed digital video signal], and outputting the resultant digital video signal. The expansion unit 110 further includes a compression circuit 152 for compressing an uncompressed digital video signal, to which the compressibility signal sent from the discrimination circuit is appended, at a level of

compressibility indicated by the compressibility signal, and a recording unit 153 for recording the compressibility signal and digital video signal on a PC card 112 via a PC card slot 111.

The PC card 112 is divided into segments associated with a plurality of [kinds] data groups, for example, patients or medical fields. Associated patient data items and medical-field data items are recorded in the segments. The discrimination circuit 151 can select a level of compressibility according to patient data or medical-field data recorded on the PC card 112, and provide a discrimination signal indicating the level of compressibility.

Replacement for the paragraph beginning at page 35, line 15 through page 36, line 2:

Then, at step S14, the compression circuit 152 compresses the digital video signal at a level of compressibility indicated by the compressibility signal. At step S15, the recording unit 153 records the resultant digital video signal on the PC card 112 together with the compressibility signal via the PC card slot 111. Thus, the compressibility signal is recorded together with the compressed digital video signal on the PC card 112. The compressed image can therefore be [stretched] decompressed properly by handling a personal computer or the like when it must be [stretched] reopened.

Replacement for the paragraph beginning at page 36, line 3:

The parameter used at step S12 in Fig. 19 is not limited to the number of pixels permitted by the CCD 106. Alternatively, the type of rigid endoscope 102 defined by an angular field of view permitted by the rigid endoscope [will do] may be used. In this case, the CPU 140 uses as a parameter any of a first endoscope, second endoscope, third endoscope, etc., which are sorted in that order from the smallest-diameter endoscope to the largest diameter one as shown in Table 3, to select a discrimination signal.

Replacement for the paragraph beginning at page 37, line 9:

Moreover, the discrimination signal to be read at step S13 in Fig. 19 may represent medical-field data as listed in Table 5 or patient data as listed in Table 6. Based on the data, the discrimination circuit 151 selects a level of compressibility.

Replacement for the two paragraphs beginning at page 38, line 16 through page 39, line 5:

Incidentally, the expansion unit 110 may be formed with a PC card. Moreover, the structure of the expansion unit [101] 110 may be, as shown in Fig. 20, included in the CCU 107.

Moreover, this embodiment has been described by taking the TV camera-mounted endoscope 104, which is the rigid endoscope 102 having the TV camera 103 mounted thereon, for instance. The embodiment is not limited to this type of endoscope. Alternatively, a TV camera-mounted soft endoscope, which is a soft endoscope having the TV camera mounted thereon, or an electronic endoscope having a CCD incorporated in a distal part of an insertion unit thereof [will do] may be used in connection with this embodiment.

Replacement for the paragraph beginning at page 39, line 19:

A plurality of endoscopes can be, as shown in Fig. 22, connected to the camera head 202. For example, a small-diameter scope 201a employed in the field of urology or the like, a large-diameter scope 201b used as a laparoscope or the like, and any other endoscope having different specifications can be alternately mounted for use on camera head 202.

Replacement for the two paragraphs beginning at page 40, line 1, through page 41, line 4:

The CCU 203 includes, as shown in Fig. 23, a CCD drive circuit 210 for driving a CCD 209 that is an imaging device incorporated in the camera head 202, a pre-processing circuit 211 for pre-processing a signal output from the CCD 209, a wave detector 212 for detecting the waveform of an output of the pre-processing circuit 211, a light adjustment control circuit 214 for sending a control signal to the CCD drive circuit 210 and a light source control circuit 213 for controlling an amount of light emanating from a light source, which is not shown, so as to adjust light. On the succeeding [stage] side of the pre-processing circuit 211, there are an AGC circuit 215 for controlling a gain automatically, a white balance circuit 216 for adjusting the white balance of an output image, a tone circuit 217 for adjusting the tone of an output image, a contour enhancement circuit 218 for enhancing the contour of an output image, and an encoder 219 for converting a video signal into a standard video signal. Thus, a video signal representing an object image is output to a monitor that is not shown.

Moreover, the CCU 203 is provided with a CPU 220 for controlling the light adjustment control circuit 214, white balance circuit 216, tone circuit 217, and contour enhancement circuit 218, a memory card driver 221 connected to the memory card 207 for driving the memory card 207 or transferring data to or from the memory card 207, and a front panel 222 having an indicator for indicating a setting for an operation and having operation switches arranged thereon.

Replacement for the paragraph beginning at page 41, line 14 through page 42, line 5:

Next, the operation of the endoscopic imaging system of this embodiment will be described. In the endoscopic imaging system of this embodiment, a video signal representing an object image is photoelectrically converted by the CCD 209 in the camera head 202, and then input to the CCU 203. The pre-processing circuit 211, AGC circuit 215, white balance circuit 216, tone circuit 217, contour enhancement circuit 218, and encoder 219 incorporated in the CCU 203 process the video signal. The object image is then displayed on the monitor [that is], not shown in the figure. At this time, the wave detector 212 detects the waveform of an output of the CCD 209, and outputs a wave detection signal. Based on the wave detection signal, the light adjustment control circuit 214 controls the CCD drive circuit 210 and light source control circuit 213 to control light adjustment for adjusting the brightness of an image.

Replacement for the two paragraphs beginning at page 42, line 6:

With a difference in field in which an endoscope is employed, the state of an object differs, and a way of displaying a produced image and the tone of the image differ correspondingly. Adjustment values including a white balance [set] setting value, a tone [set] setting value, a level of enhancement, and a frequency must therefore be varied depending on an object region to be observed. [Setting] The settings for an operation must thus be attained properly.

Replacement for the paragraph beginning at page 42, line 24, through page 43, line 11:

In this embodiment, a memory card 207 in which appropriate adjustment values are stored is prepared for each object field. When the endoscopic imaging system is put to use, the camera head 202 is mounted on an associated endoscope 201, and a memory card 207 associated with an

intended field is inserted into the card slot 206. The CPU 220 reads [set] setting data[,] which represent the adjustment values [and is] stored in the memory card 207, via the memory card driver 221. The CPU 220 then sends a control signal to each of the light adjustment control circuit 214, white balance circuit 216, tone circuit 217, and contour enhancement circuit 218. Thus, various adjustment values are modified.

Replacement for the paragraph beginning at page 43, line 12:

Fig. 27 shows an example of [set] setting data representing adjustment values in relation to object fields. For the field of urology or for the field using an arthroscope, the adjustment values are specified in order to attain a low speed of light adjustment, a low level of light adjustment, a bluish level of tone, and a high degree of contour enhancement. Moreover, for the field using a laparoscope, the adjustment values are specified in order to attain a high speed of light adjustment, a high level of light adjustment, a reddish level of tone, and a low degree of contour enhancement.

Replacement for the two paragraphs beginning at page 44, line 14:

Since settings for operations of light adjustment control, tone adjustment and contour enhancement are thus modified, the endoscopic imaging system can be set to a state suitable for [an] a particular object field by carrying out simple handling. Endoscopic observation can therefore be carried out in an optimal operational environment at all [the time] times.

Moreover, the endoscopic imaging system of this embodiment includes an [alarming] alarm means for giving an alarm to a user when an incorrect memory card inconsistent with an intended object field is inserted. The operation of the [alarming] alarm means will be described in conjunction with Figs. 28 and 29.

Replacement for the three paragraphs beginning at page 45, line 1 through page 46, line 3:

The CPU 220 in the CCU 203 reads, as described in the flowchart of Fig. 28, set data representing adjustment values from the memory card 207 inserted into the card slot 206 at step S21. At step S22, a picture size for an object image is sensed according to wave detection-related information represented by an image signal output from the CCD 209. At step S23, the wave

detection-related information indicating the picture size for the object image is compared with object field information corresponding to the [set] setting data stored in the memory card 207. It is then judged whether or not the picture size agrees with a picture size specified for an object field defined by the type of connected endoscope or a region to be observed.

If the picture size agrees with the picture size specified for the object field, it is judged that a correct memory card has been inserted. Control is then passed to step S24. Subsequent setting modification or the like is carried out. By contrast, if the picture size disagrees therewith, it is judged that an incorrect memory card has been inserted. Control is passed to step S25[. Alarm], whereupon an alarm display is carried out. [Alarm] The alarm display is, for example, such that an alarm having the contents shown in Fig. 29 is displayed in a screen of the monitor 228.

Owing to the [alarming] alarm means, even when an incorrect memory card is inserted, a user can be informed of the fact and aware of incorrect use. A fear of establishing a [set] setting state unintended by the user can be eliminated.

Replacement for the two paragraphs beginning at page 46, line 5 through page 47, line 1:

The seventh embodiment is an example in which a memory card [on which] having proper adjustment values [are] stored thereon is prepared for each doctor, and in which settings for various operations can be modified. A memory card 207a dedicated to Dr. A shown in Fig. 30 and a memory card [207] 207b dedicated to Dr. B shown in Fig. 31 are made available. When either of the doctors uses the endoscopic imaging apparatus, his/her own memory card is inserted into the card slot 206 of the CCU 203. Like the sixth embodiment, settings for operations of light adjustment control, tone adjustment, and contour enhancement are modified so that desired adjustment values can be specified.

For example, assuming that Dr. A likes a bright and reddish image, [set] setting data associated with such an image is stored on the memory card 207a. Specifically, the brightness of the image is set to a higher level and the tone thereof is set to a [bluish] reddish level. Moreover, assuming that Dr. B likes a dark and bluish image [set] setting data associated with such an image is stored on the memory card 207b. Specifically, the brightness of the image is set to a lower level and the tone thereof is set to a bluish level.

Replacement for the two paragraphs beginning at page 47, line 2 through page 48, line 2:

In the conventional system, a setting menu screen shown in Fig. 46 is displayed on the monitor or the like. Settings of tone and brightness are modified for each doctor. Handling for setting modification is therefore [a] rather a nuisance. Moreover, an amount of data representing adjustment values[,] which can be stored[,] is limited because of the storage capacity of a memory. This leads to drawback that many [set] setting items cannot be stored. [By] In contrast, according to this embodiment, a setting for an operation concerning a desired item can be readily modified [readily] merely by inserting a memory card. Thus, the item can be set to an optimal value. Settings desired by a doctor can be attained by performing simple handling. Thus, a state suitable for a user can be established by performing simple handling, and endoscopic observation can be achieved under an optimal operational environment at all [the time] times.

According to the foregoing embodiment, simple handling or insertion of an associated memory card should merely be carried out according to a use situation, [that is] i.e., an object field relevant to an endoscopic examination or a doctor in charge thereof. Thus, proper adjustment values can be set in various adjusting means for carrying out light adjustment control, tone adjustment, and contour enhancement. A proper operational environment can be established readily.

Replacement for the paragraph beginning at page 48, line 24 through page 49, line 9:

As shown in Fig. 32, an endoscopic imaging system 301 of this embodiment comprises a camera head 302 having an imaging means incorporated therein, a scope 303 connected to the camera head 302, a light source apparatus 304 for supplying illumination light to the scope 303, a camera control unit (hereinafter a CCU) 305 for processing a signal sent from the imaging means in the camera head 302, and a TV monitor 306 for displaying a standard video signal processed by the CCU 305. The scope 303 is a rigid endoscope such as a laparoscope used for, for example, a surgical procedure in the field of surgery.

Replacement for the two paragraphs beginning at page 49, line 10 through page 50, line 11:

When the endoscope imaging system 301 is put to use, a light guide 308 of the scope 303 is, as shown in Fig. 32, linked to the light source apparatus 304. Illumination light emanating from a lamp in the light source apparatus 304 passes through a diaphragm that is not shown, is converged by a lens, and falls on an [opposed] opposing end surface of the light guide 308. The illumination light is transmitted to the scope 303 over the light guide 308, propagated through the scope, and emitted forward through the distal end of the scope 303. An object such as a patient's body cavity is then illuminated. An image represented by light reflected from the illuminated object is formed by the scope 303. The object image is projected by the imaging means in the camera head 302 through the scope 303.

A CCD 307 serving as the imaging means is located on the focal plane of an imaging lens in the camera head 302. The object image is formed on the image plane of the CCD 307 and converted photoelectrically. The CCD 307 is connected to the CCU 305 [over] via a camera cable 309 in which a CCD driving signal transmission line and a CCD output signal transmission line are inserted. An output signal of the CCD 307 is sent to CCU 305 and subjected to various kinds of signal processing. A video signal output from the CCU 305 is sent to the TV monitor 306. A view image of the object is then displayed on the TV monitor 306.

Replacement for the paragraph beginning at page 50, line 25, through page 51, line 8:

On a succeeding [stage] side of the pre-processing circuit 312, there are an A/D converter 313 and a Y/C separation circuit 314. A CCD output signal input to the pre-processing circuit 312 is pre-processed by performing correlation double sample (CDS) and sample-and-hold (S/H). The resultant signal is then input to the A/D converter 313 and converted into a digital signal. The digital signal is then input to the Y/C separation circuit 314.

Replacement for the two paragraphs beginning at page 51, line 9 through page 52, line 6:

On a succeeding [stage] side of the Y/C separation circuit 314, there are an RGB matrix circuit 315 and a white balance/black balance adjustment circuit 316. A digital signal input to the Y/C separation circuit 314 is recomposed in conformity with the line sequential system. Digital

signal Y, CR, and CB to be propagated through three channels are separated from one another, and input to the RGB matrix circuit 315. The digital signals are then converted into an RGB digital signal. Thereafter, the white balance/black balance adjustment circuit 316 adjusts the white balance and black balance of the signal.

On a succeeding [stage] side of the white balance/black balance adjustment circuit 316, there are a digital video processing circuit 317, a D/A converter 318, and a post-processing circuit 319. An RGB digital signal whose balance has been adjusted is digitally processed through enhancement, gamma correction, and character convolution performed by the digital video processing circuit 317. Thereafter, the signal is converted into an analog signal by the D/A converter 318, and then input to the post-processing circuit 319. The analog signal that is input to the post-processing circuit 319 is converted into a standard video signal and output to the TV monitor 306.

Replacement for the two paragraphs beginning at page 52, line 7 through page 53, line 2:

On the succeeding [stage] side of the digital video processing circuit 317, there are a memory 320, a JPEG compression circuit 321, and a PC card driver 322. A PC card slot 323 is connected to the PC card driver 322. A digital signal having undergone various kinds of signal processing is stored in the memory 320. A PC card 324 having a memory incorporated therein is mounted in the PC card slot 323. After a digital image signal read from the memory 320 is compressed by the JPEG compression circuit 321, it is recorded on the PC card 324 via a PC card driver 322.

Furthermore, the CPU 325 responsible for various kinds of control including control of recording [of] an image on the PC card 324, a connection sensing means 326 for sensing the connected state of the PC card 324, and a character generator 327 for outputting medium information that includes the recorded [situation] quantity of image data on the PC card 324 and appears as a display on monitor 306 screen are included in the CCU 305. A release switch 329 used to give a handling instruction (release instruction) for image recording is formed on the front panel 328 of the CCU 305.

Replacement for the paragraph beginning at page 54, line 21 through page 55, line 5:

During image recording, the CPU 325 reads information of a storage capacity for image data on the PC card 324 and information of the connected state of the PC card 324 sensed by the connection sensing means 326. Information [of the recorded situation] of the image data recorded on the medium is output. The connected state of the PC card 324 is sensed by checking a high-level or low-level signal that is output from the connection sensing means 326 according to whether or not the PC card 324 is inserted in the PC card slot 323.

Replacement for the two paragraphs beginning at page 56, line 1:

When an endoscopic image is thus recorded using a PC card, a still image [whose quality has] having little [deteriorated] deterioration can be recorded and stored at low cost. Moreover, when the image is recorded, medium information such as the [recorded situation] recording capacity of image data on the PC card can be superimposed on a view image on a monitor. A user can therefore recognize the connected state of the PC card and the number of remaining recordable images readily.

When digital image data is compressed and recorded on a medium such as a PC card, the number of remaining recordable images varies depending on a level of compressibility of data or a storage capacity on a medium. It is therefore hard for a user to grasp the [recorded situation] recording capacity of image data. According to this embodiment, medium information can be checked accurately. It can be prevented that recording a necessary image fails because of imperfect connection of the PC card or an insufficient storage capacity.

Replacement for the paragraph beginning at page 56, line 23 through page 57, line 5:

As shown in Fig. 37, the CCU 305 has, in addition [with] to the components of the eighth embodiment shown in Fig. 32, and LCD 345 formed on the front panel thereof. The CCU 305 also has an LCD driver 346 for driving the LCD 345 therein. The LCD driver 346 is connected to the CPU 325 and character generator 327. Character information of medium information generated by the character generator 327 is displayed on the LCD 345.

Replacement for the two paragraphs beginning at page 57, line 6:

The components of this embodiment other than the components relevant to display of medium information and the operation thereof are identical to those of the eighth embodiment. The description of those components will thus be omitted.

During image recording, the CPU 325 reads information of a storage capacity for image data on the PC card 324 and information of the connected state of the PC card sensed by the connection sensing means 326 in the same manner as that [if] of the eighth embodiment. The number of recordable images or the like is then calculated. The information of the [recorded situation of] image data recording capacity on the medium is then output. Medium information such as the number of recordable images output from the character generator 327 is output as character information from the character generator 327 to the LCD driver 346. The medium information is displayed on the LCD 345 on the front panel of the CCU 305.

Replacement for the paragraph beginning at page 58, line 8:

Medium information such as the [recorded situation] recording capacity of image data on a PC card is displayed on the front panel of a CCU or the like separately from a view image on a monitor. A user can therefore recognize the connected state of the PC card and the number of remaining recordable images as readily as he/she can in the eighth embodiment. Moreover, according to the ninth embodiment, an endoscopic image alone is displayed on the monitor. The display of medium information will not hinder viewing of an endoscopic image. The user can recognize the state of a medium any time without hampering observation or surgery.

Replacement for the two paragraphs beginning at page 58, line 21 through page 59, line 8:

The tenth embodiment is an example of a configuration including an [alarming] alarm means for displaying medium information only when it is needed and for giving an alarm to a user.

The CCU 305 has, in addition to the components of the eighth embodiment shown in Fig. 32, as shown in Fig. 39, a loudspeaker 351 for alarming. The loudspeaker 351 is connected to a loudspeaker driver 352 for converting a notification signal output from the CPU 325 into a voice signal. The components of the tenth embodiment other than the components relevant to the

alarming means are identical to those of the eighth embodiment. The description of [the] those components will thus be omitted.

Replacement for the two paragraphs beginning at page 59, line 9 through page 60, line 4:

According to the tenth embodiment, when needed, or specifically, when the PC card 324 is not mounted normally or the number of remaining images recordable on the PC card 324 becomes zero, medium information is also displayed or superimposed on an image in a screen on the TV monitor 306. Thus, a [user'] user's attention is called.

The CPU 325 calculates the number of recordable images using information of a storage capacity for image data on the PC card 324, and information of the connected state of the PC card 324 sensed by the connection sensing means 326. When it is necessary to inform a user of medium information, for example, when image recording cannot be achieved normally, the medium information is output to the character generator 327. At the same time, a notification signal is output to the loudspeaker driver 352. The medium information sent from the CPU 325 is output as character information from the character generator 327 and superimposed on an image in a screen on the TV monitor 306. In addition, an [alarming voice] audio message saying, for example, "Replace the PC card with a new one," is uttered by the loudspeaker 351.

Replacement for the paragraph beginning at page 60, line 17 through page 61, line 2:

As mentioned above, only when medium information such as the recorded [situation of] image data on the PC card is needed, it is superimposed on view image on the monitor or a voice is uttered. A user can therefore recognize the connected state of the PC card or the recorded [situation] state of image data readily at [a right] an appropriate time without discontinuing observation or hampering surgery. Thus, a failure in recording an image, the loss of a necessary image due to overwriting of a recorded image, or any other mistake can be prevented from being made during image recording.

Replacement for the paragraph beginning at page 61, line 14:

The CCU 305 has, in addition to the components of the eighth embodiment shown in Fig. [32] 41, a JPEG stretch circuit [335] 355 connected in parallel to the JPEG compression circuit 321 between the PC card driver 322 and memory 320. The JPEG stretch circuit 355 processes data by reversing the procedure followed by the JPEG compression circuit 321. In other words, the JPEG stretch circuit 355 stretches image data that has been encoded to be compressed, and thus restores it to original image data. The components other than the components relevant to the reproducing means are identical to those of the eighth embodiment. The description of [the] those components will therefore be omitted.

Replacement for the paragraph beginning at page 62, line 1:

For reproducing image data of a still image recorded on the PC card 324, image data is read from the PC card 324 via the PC card driver [323] 322 in response to an instruction sent from the CPU 325. The image data is stretched by the JPEG stretch circuit 355, and then stored in the memory 320. The stretched image data is read from the memory 320, and converted into a standard video signal by the D/A converter 318 and post-processing circuit 319. The resultant image data is output to and displayed on the TV monitor 306.

Replacement for the paragraph beginning at page 62, line 15:

Since a still image recorded on a PC card can thus be displayed, a user can check if the recorded image is necessary. Consequently, unnecessary images can be identified and deleted. A larger number of necessary images can be recorded on the PC card. Moreover, a PC card must be replaced with another at a [minimum] reduced frequency during an endoscopic examination. The labor of replacing a medium with another can be minimized, and the cost required for the running of a medium can be reduced.

Replacement for the paragraph beginning at page 62, line 25, through page 63, line 2:

The twelfth embodiment is an example of a configuration including an LED for displaying a releasing [frequency] count on the front panel of a CCU.

Replacement for two paragraphs beginning at page 63, line 3 through page 64 line 2:

CCU 305 has, in addition to the components of the eighth embodiment shown in Fig. 32, as shown in 43, an LED 361 for displaying numerals, such as[,] a seven-segment display formed on the front panel thereof. Moreover, a font generator 362 for driving the LED 361 for display is incorporated in the CCU 305. The font generator 362 is connected to the CPU 325. Based on information concerning release performed during image recording[,] which is output from the CPU 325, information of a releasing [frequency] count is indicated with numerals on the LED 361. The components of the twelfth embodiment other than the components relevant to display of the releasing [frequency] count are identical to those of the eighth embodiment. The description of [the] those components will thus be omitted.

When the release switch 329 is pressed in order to record an endoscopic image, the CPU 325 sends a release signal to the memory 320. Image data of a still image is then read from the memory 320. The read image data is compressed by the JPEG compression circuit 321, and sent to and recorded on the PC card 324 mounted on the PC card slot 323 via the PC card driver 322. At this time, the CPU 325 sends release information to the font generator 362, and numerals indicating a releasing [frequency] count are displayed on the LED 361. The releasing [frequency] count is incremented by one with every release.

Replacement for the paragraph beginning at page 64, line 3:

As mentioned above, a display means for displaying medium information concerning the number of images that are represented by image data and recordable on the PC card is formed on the front panel of a CCU or the like. A user can therefore readily recognize [the recorded situation of image] recording data such as the number of remaining images recordable on the PC card.

Replacement for the paragraph beginning at page 64, line 25, through page 65, line 4:

Moreover, the PC card slot to which a PC card is connected is not limited to a structure formed on the front panel of a CCU. Alternatively, a structure provided separately from the CCU and detachably attached thereto [will do] may be used in connection with the present invention.

Replacement for the paragraph beginning at page 65, line 5:

According to the present invention, it is apparent that a wide range of different embodiments can be constructed without a departure from the spirit and scope of the present invention. This invention is limited [to] by the appended [embodiments] claims but not restricted to any specific embodiments described herein.

CLAIMS:

11. (Amended) An endoscopic imaging system, comprising:

an imaging device [means] for projecting an object image of an object inside [in] a body cavity;

a digital signal converter [converting means] for converting an image signal sent from said imaging means into a digital signal;

a signal processor [processing means] for processing said digital signal sent from said digital signal converter [converting means];

a discriminating signal appending circuit [means] for appending a [given] discrimination signal to said digital signal processed by said signal processor [processing means];

a compression circuit [compressing means] for determining a level of compressibility according to said discrimination signal appended by said discrimination signal appending circuit [means], and for compressing said digital signal processed by said signal processor [processing means]; and

a recording unit [means] for recording said digital signal compressed by said compression circuit [compressing means] on a recording medium.

12. (Amended) An endoscopic imaging system according to claim 11, wherein said discrimination signal is produced according to at least one [any] of a type of imaging device [means], a type of endoscope, a level of enhancement performed by said signal processor [processing means], and [given] data recorded in advance on said recording medium.

13. (Amended) An endoscopic imaging system according to claim 12, wherein said [given] data recorded in advance on said recording medium is medical-field data or patient data.

FIG.18

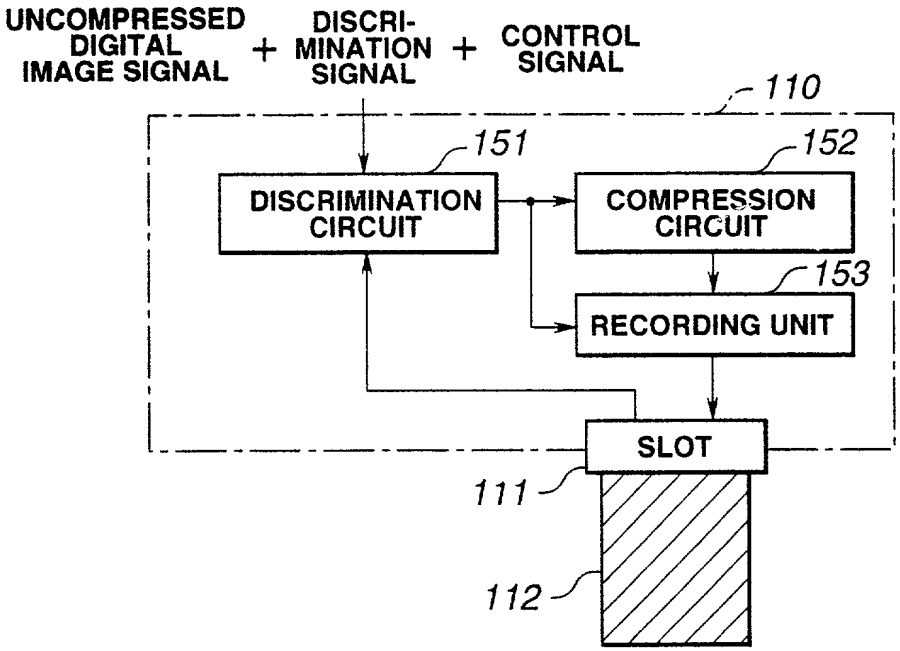

UNCOMPRESSED DIGITAL IMAGE SIGNAL
+
DISCRI-MINATION SIGNAL
+
CONTROL SIGNAL
110
151
152
DISCRIMINATION CIRCUIT
COMPRESSION CIRCUIT
153
RECORDING UNIT
SLOT
111
112

FIG.19

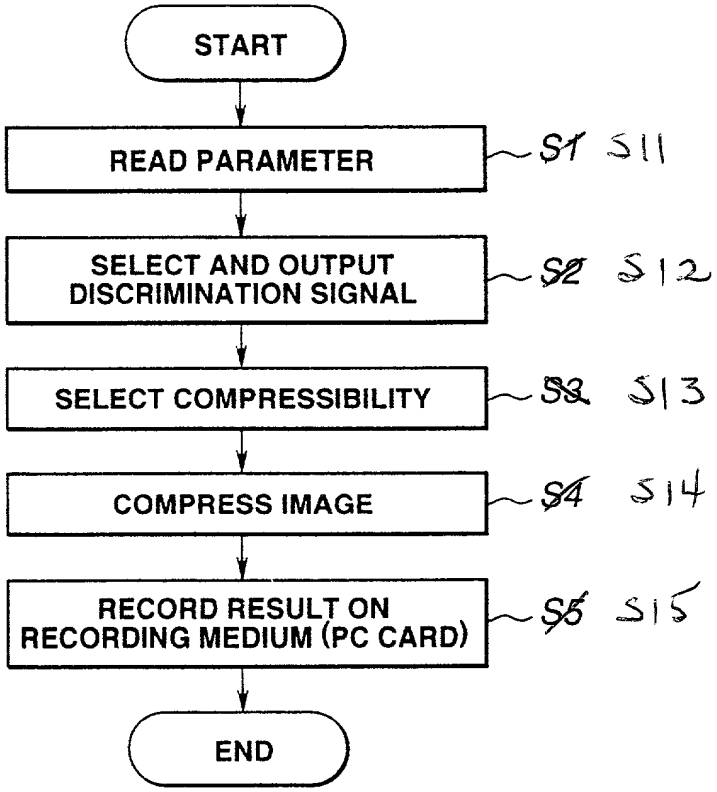

START
READ PARAMETER
S1 S11
SELECT AND OUTPUT DISCRIMINATION SIGNAL
S2 S12
SELECT COMPRESSIBILITY
S3 S13
COMPRESS IMAGE
S4 S14
RECORD RESULT ON RECORDING MEDIUM (PC CARD)
S5 S15
END

FIG.21

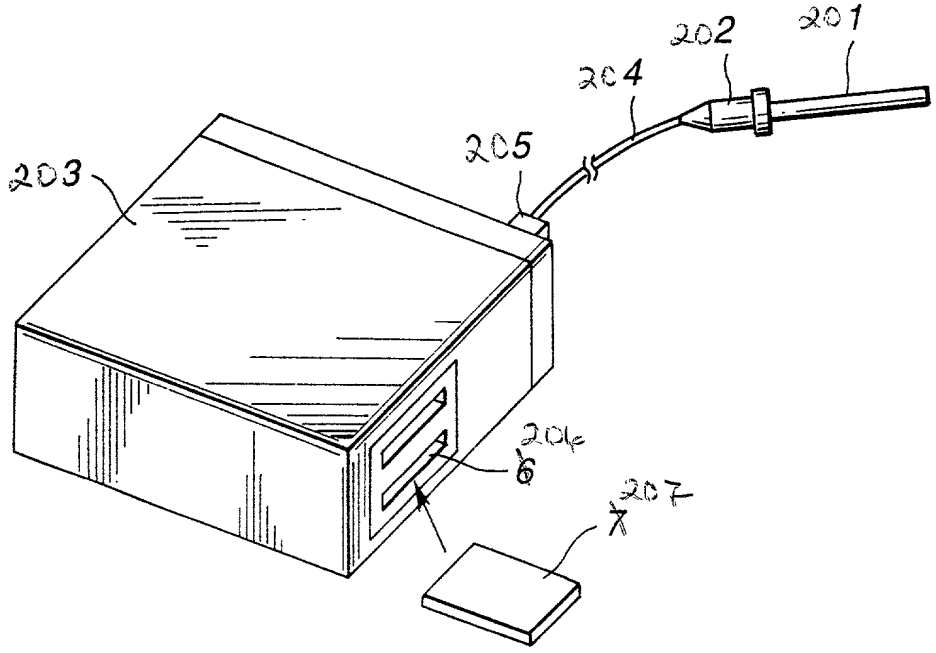


FIG.22

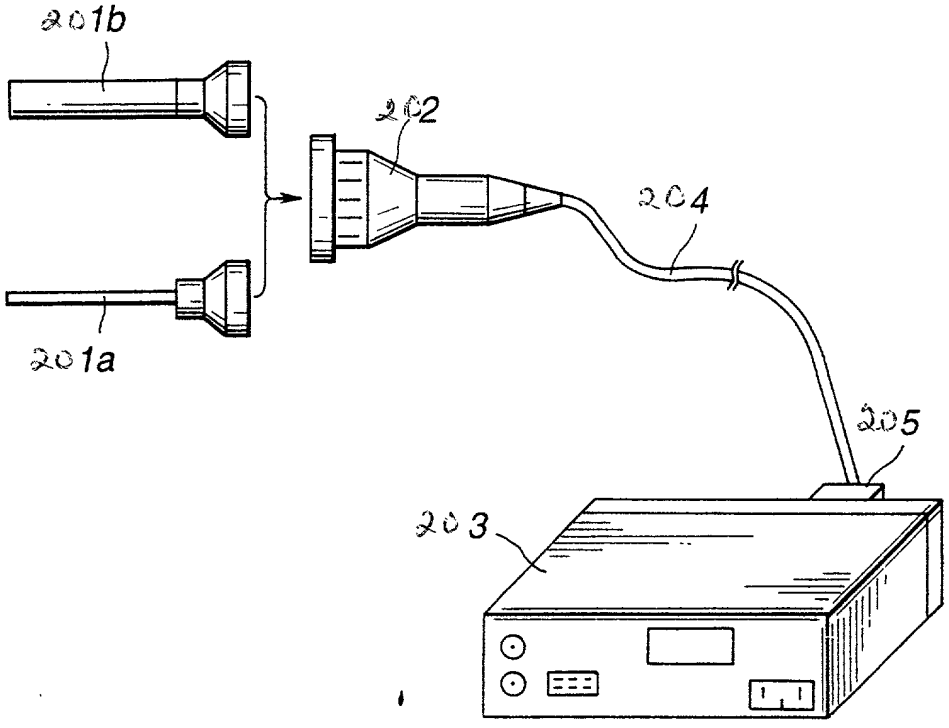


FIG.23

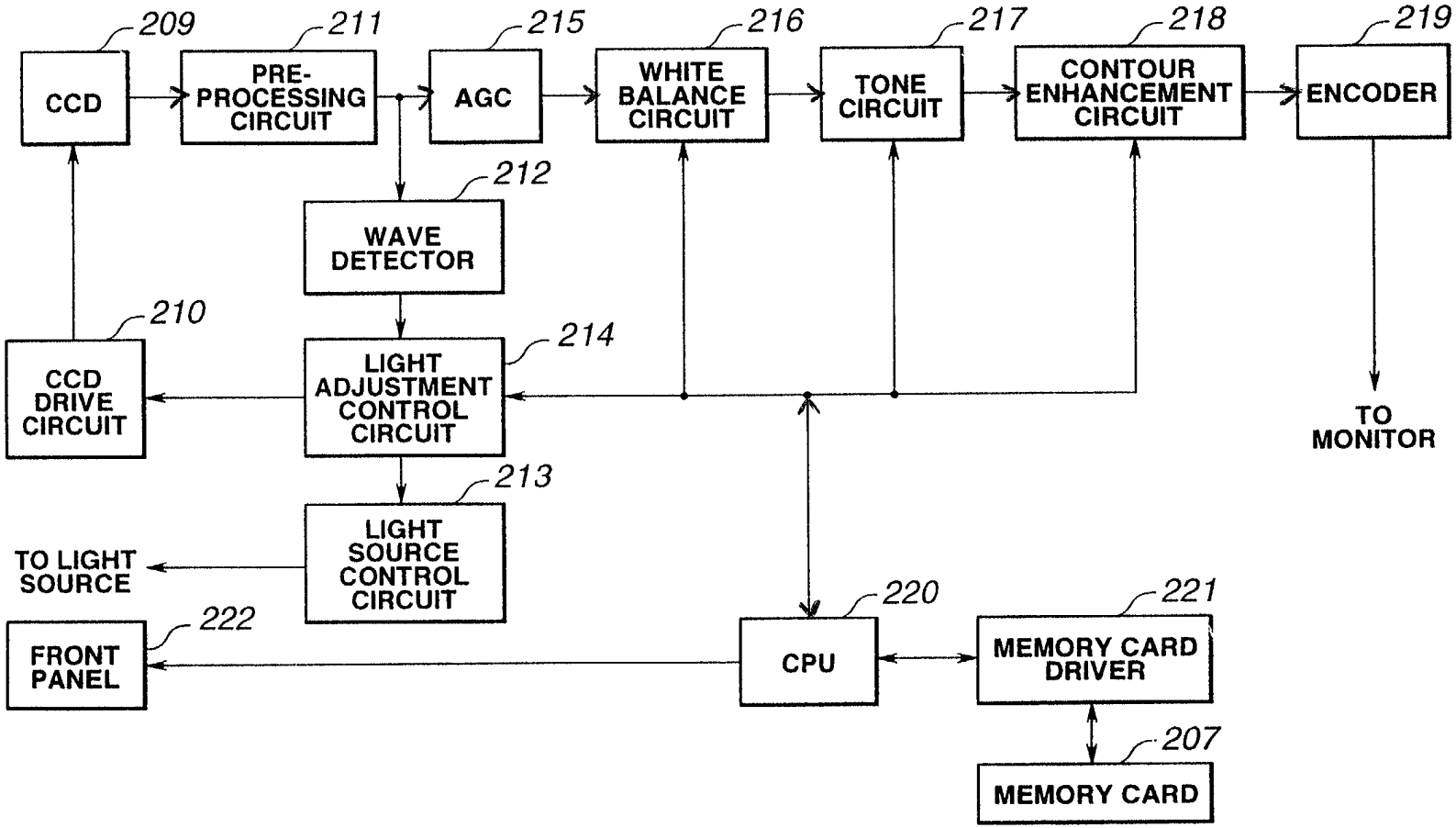

209
CCD
211
PRE-PROCESSING CIRCUIT
215
AGC
216
WHITE BALANCE CIRCUIT
217
TONE CIRCUIT
218
CONTOUR ENHANCEMENT CIRCUIT
219
ENCODER
TO MONITOR
212
WAVE DETECTOR
210
CCD DRIVE CIRCUIT
214
LIGHT ADJUSTMENT CONTROL CIRCUIT
213
LIGHT SOURCE CONTROL CIRCUIT
TO LIGHT SOURCE
222
FRONT PANEL
220
CPU
221
MEMORY CARD DRIVER
207
MEMORY CARD

FIG.32

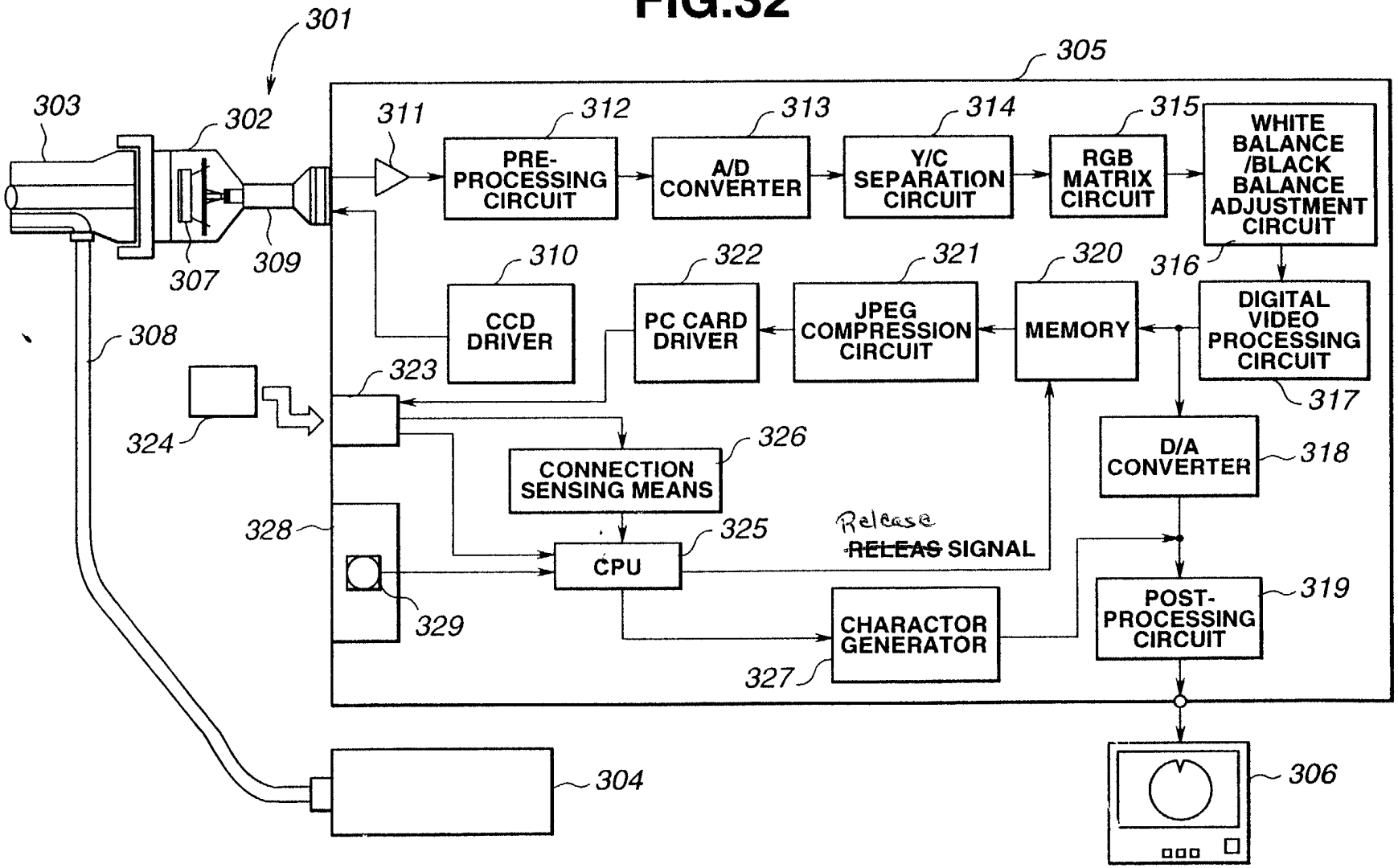

301
303
302
305
311
312
313
314
315
WHITE BALANCE /BLACK BALANCE ADJUSTMENT CIRCUIT
PRE-PROCESSING CIRCUIT
A/D CONVERTER
Y/C SEPARATION CIRCUIT
RGB MATRIX CIRCUIT
316
310
322
321
320
CCD DRIVER
PC CARD DRIVER
JPEG COMPRESSION CIRCUIT
MEMORY
DIGITAL VIDEO PROCESSING CIRCUIT
317
307
309
308
323
324
326
CONNECTION SENSING MEANS
D/A CONVERTER
318
328
325
Release
RELEAS SIGNAL
CPU
329
CHARACTOR GENERATOR
POST-PROCESSING CIRCUIT
319
327
304
306

FIG.37

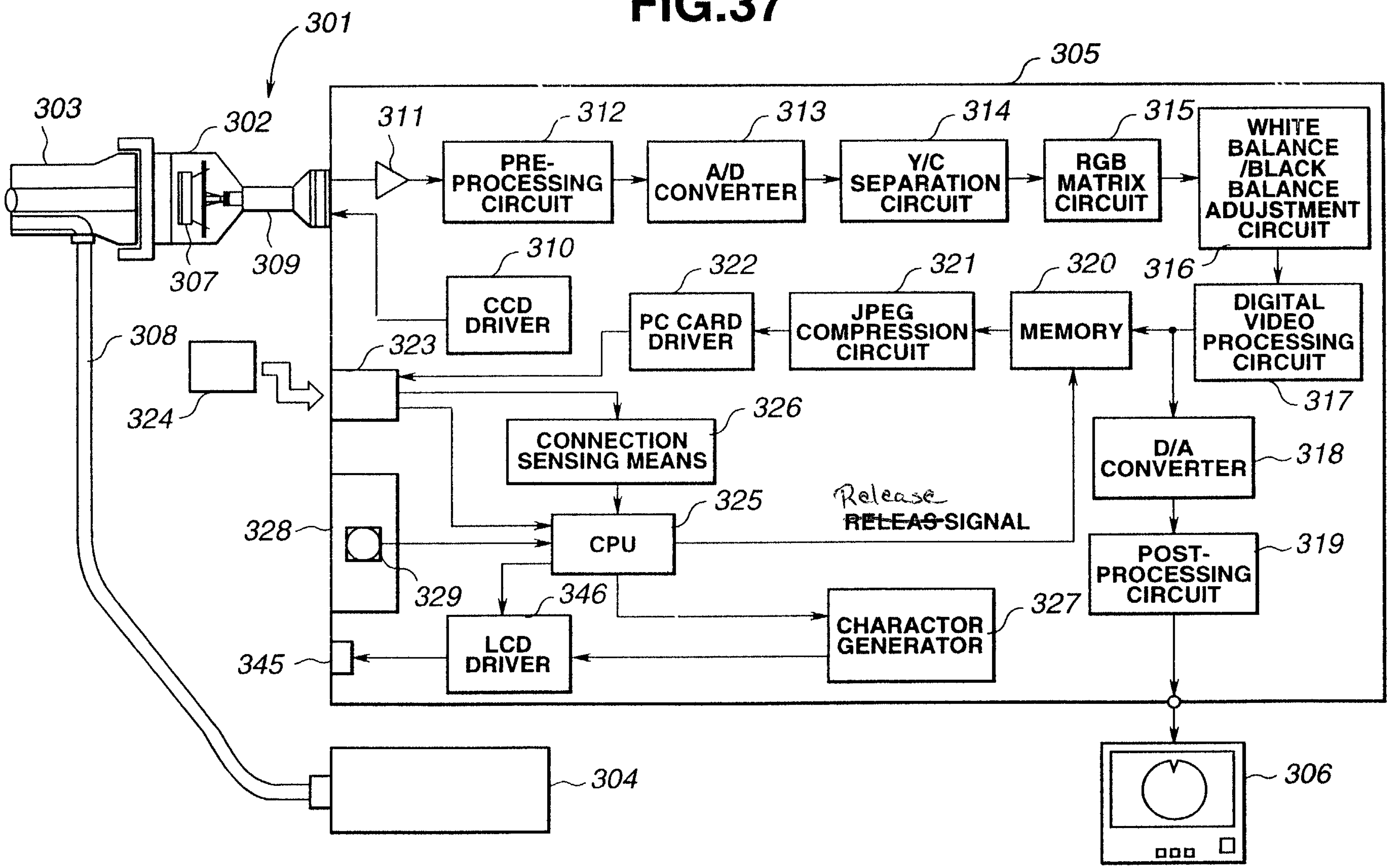

301
303
302
307
309
308
324
328
329
345
304
305
311
312
PRE-PROCESSING CIRCUIT
313
A/D CONVERTER
314
Y/C SEPARATION CIRCUIT
315
RGB MATRIX CIRCUIT
WHITE BALANCE /BLACK BALANCE ADUJSTMENT CIRCUIT
316
310
CCD DRIVER
322
PC CARD DRIVER
321
JPEG COMPRESSION CIRCUIT
320
MEMORY
DIGITAL VIDEO PROCESSING CIRCUIT
317
323
326
CONNECTION SENSING MEANS
325
CPU
Release
RELEAS SIGNAL
D/A CONVERTER
318
POST-PROCESSING CIRCUIT
319
346
LCD DRIVER
CHARACTOR GENERATOR
327
306

FIG.39

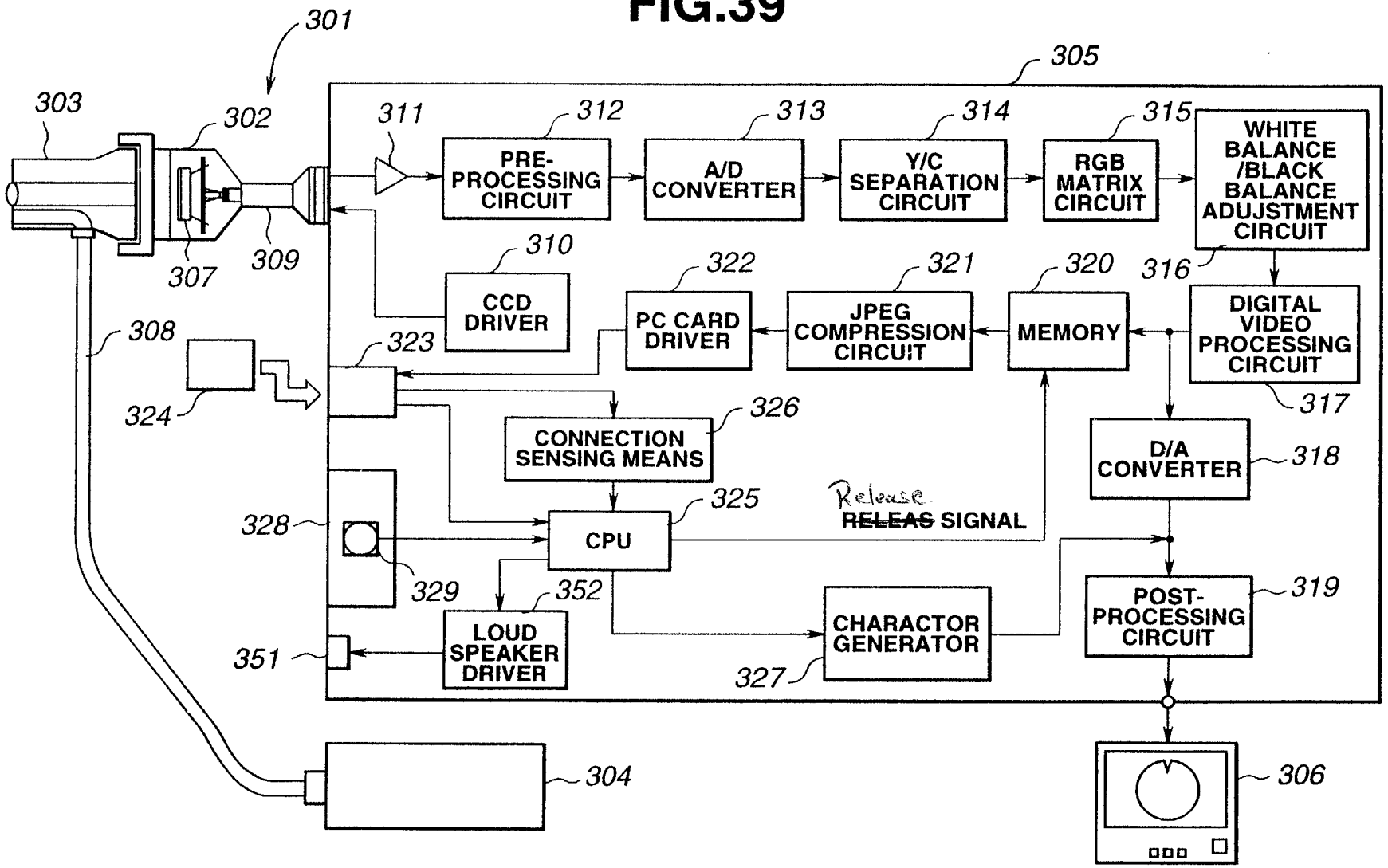

301
303
302
305
311
312
313
314
315
WHITE BALANCE /BLACK BALANCE ADUJSTMENT CIRCUIT
PRE-PROCESSING CIRCUIT
A/D CONVERTER
Y/C SEPARATION CIRCUIT
RGB MATRIX CIRCUIT
310
CCD DRIVER
307
309
316
322
321
320
PC CARD DRIVER
JPEG COMPRESSION CIRCUIT
MEMORY
DIGITAL VIDEO PROCESSING CIRCUIT
308
323
317
324
326
CONNECTION SENSING MEANS
D/A CONVERTER
318
325
Release
RELEAS SIGNAL
328
CPU
329
352
319
POST-PROCESSING CIRCUIT
CHARACTOR GENERATOR
351
LOUD SPEAKER DRIVER
327
304
306

FIG.41

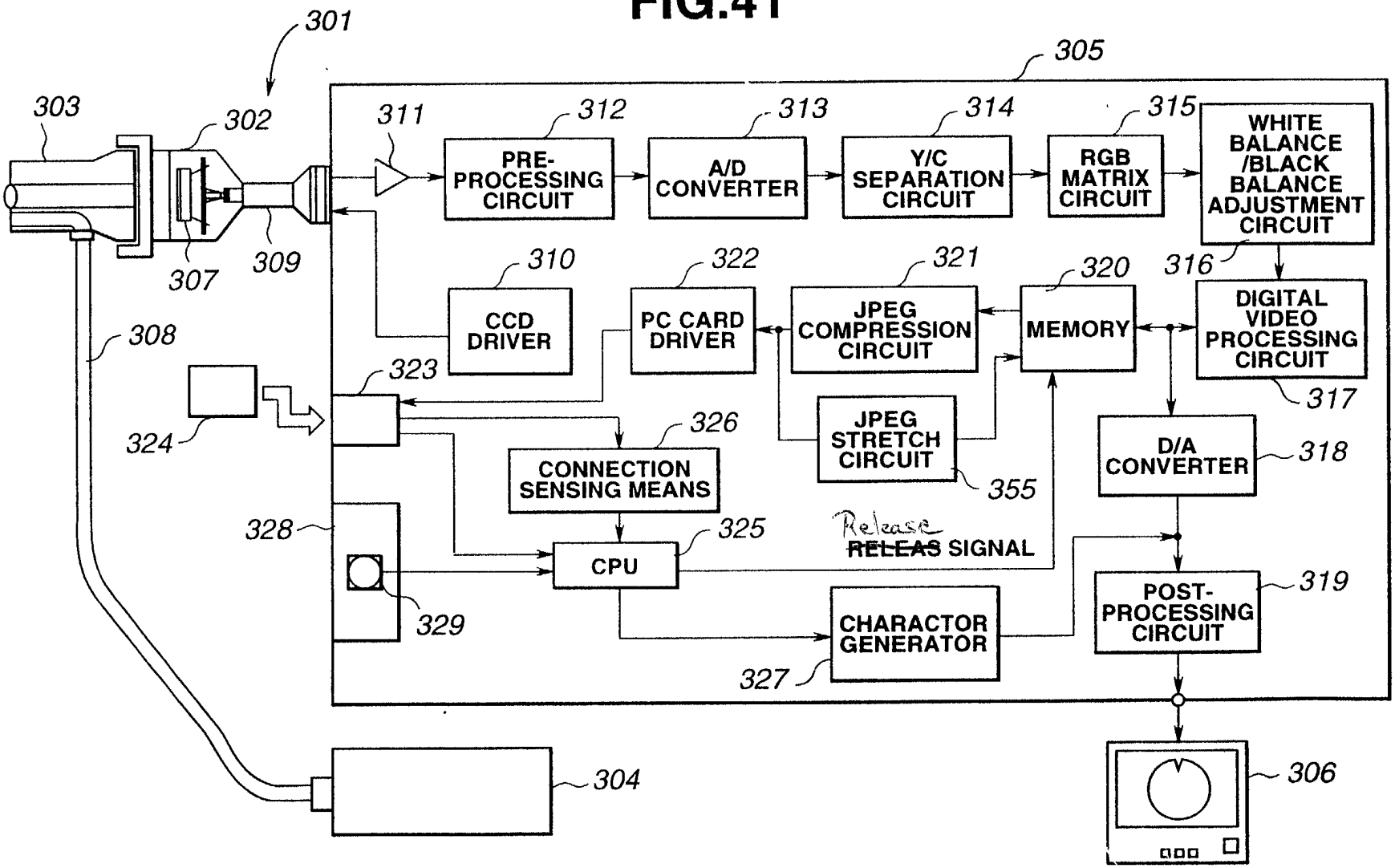
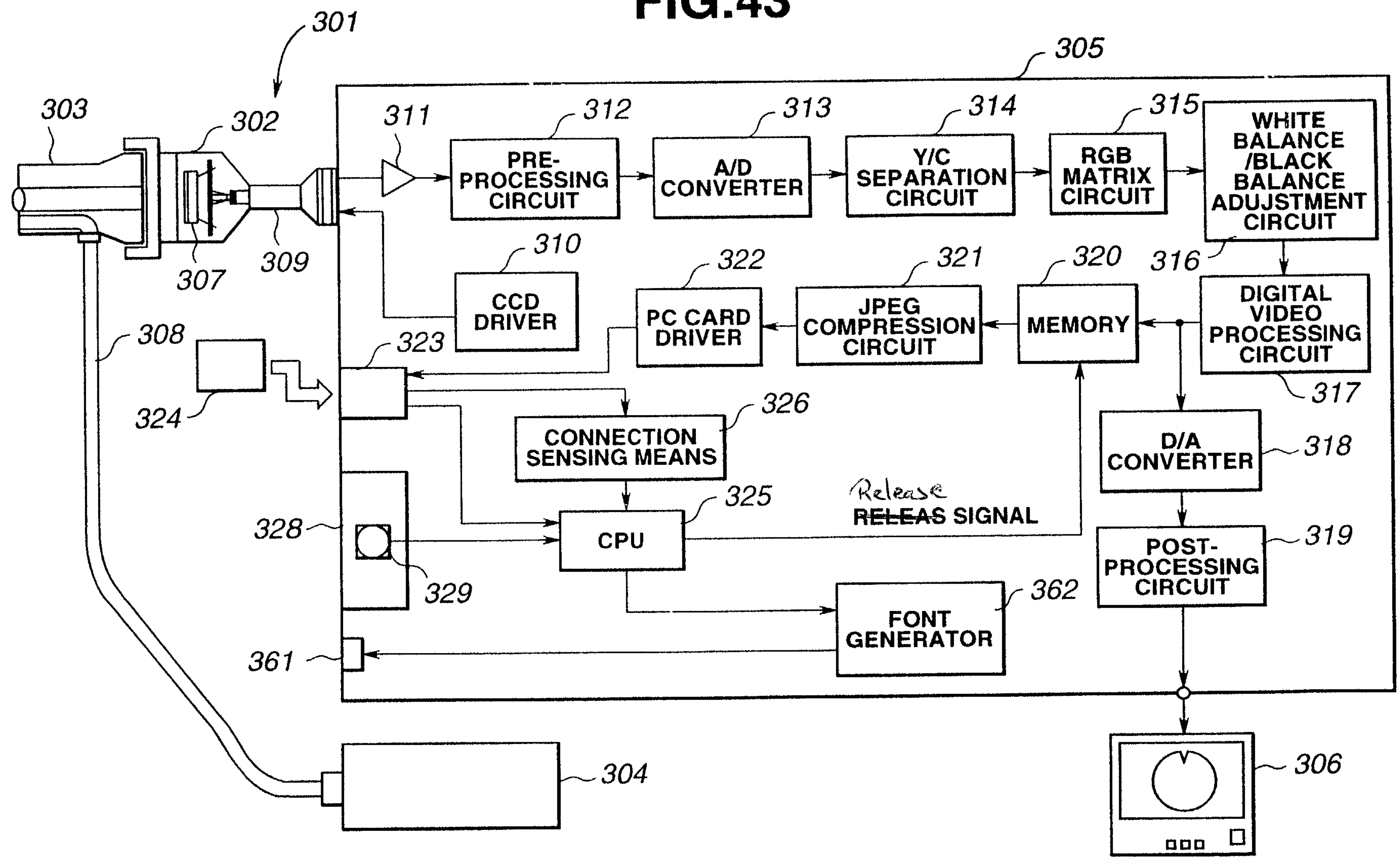

301
303
302
307
309
305
311
312
PRE-PROCESSING CIRCUIT
313
A/D CONVERTER
314
Y/C SEPARATION CIRCUIT
315
RGB MATRIX CIRCUIT
WHITE BALANCE /BLACK BALANCE ADJUSTMENT CIRCUIT
316
310
CCD DRIVER
322
PC CARD DRIVER
321
JPEG COMPRESSION CIRCUIT
320
MEMORY
DIGITAL VIDEO PROCESSING CIRCUIT
317
308
323
324
326
CONNECTION SENSING MEANS
JPEG STRETCH CIRCUIT
355
D/A CONVERTER
318
328
325
Release
RELEAS SIGNAL
CPU
329
CHARACTOR GENERATOR
POST-PROCESSING CIRCUIT
319
327
304
306

FIG.43


301
302
303
304
305
306
307
308
309
310
CCD DRIVER
311
312
PRE-PROCESSING CIRCUIT
313
A/D CONVERTER
314
Y/C SEPARATION CIRCUIT
315
RGB MATRIX CIRCUIT
316
WHITE BALANCE /BLACK BALANCE ADUJSTMENT CIRCUIT
317
DIGITAL VIDEO PROCESSING CIRCUIT
318
D/A CONVERTER
319
POST-PROCESSING CIRCUIT
320
MEMORY
321
JPEG COMPRESSION CIRCUIT
322
PC CARD DRIVER
323
324
325
CPU
326
CONNECTION SENSING MEANS
328
329
361
362
FONT GENERATOR
Release
RELEAS SIGNAL